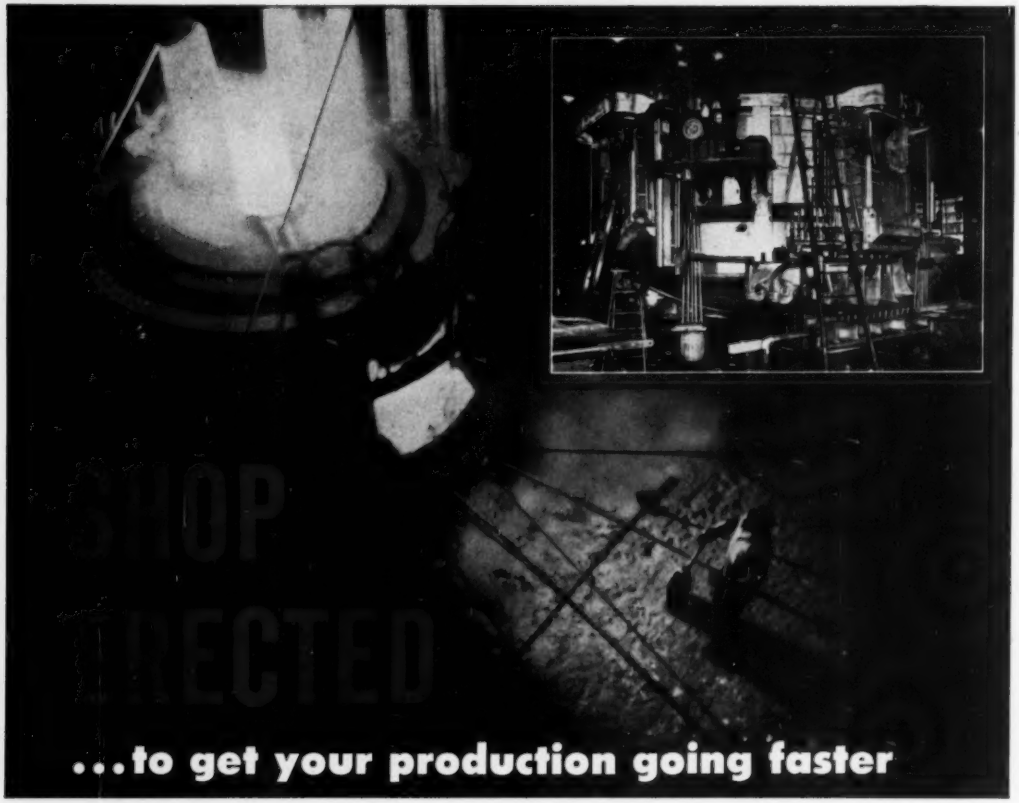
# Foundryman

The Foundrymen's Own Magazine

PRE-CONVENTION Issue

APRIL 1952



## ...to get your production going faster

Lectromelt Furnaces — even the BIG babies — are completely assembled and mechanically operated here on our erection floor at Pittsburgh. This means they go together faster in your plant and you get into production without loss of time.

Lectromelt considers the power supply and regulating apparatus as important as the furnace itself. They'll even help engineer your materials-handling equipment. Both are additional reasons why Lectromelt Furnaces get going on production faster and at lower cost.

Melting, refining, smelting and reduction have been carried on for many years efficiently and economically with Lectromelt Furnaces. Our engineers will help put them to work for you. For Bulletin No. 7 telling you more about these furnaces, write Pittsburgh Lectromelt Furnace Corporation, 316 32nd Street, Pittsburgh 30, Pa.

**Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektrougnar A/B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.**

WHEN YOU MELT...

MOORE RAPID

*Lectromelt*

# THE ONLY CORE BLOWER WITH A *Mechanized* SAND MAGAZINE

*Motor-driven plows and "aerating" air circuit make it possible for the*

## SAN-BLO

- To blow *any* core sand mixture that can be hand-rammed, including resin-bonded sands!
- To blow or green-top cores with *regular facing sand*—without additional hand-ramming!
- To blow sand mixtures with moisture content up to *8%*—green bond strength up to *8 lbs.!*
- To blow all cores weighing up to 40 lbs. each, *without* changing sand magazine!
- To *blow* sand—not push it! No "piping" or "bridging" in SAN-BLO's sand magazine!
- To blow a *range* of core sizes otherwise requiring 3 or 4 different size core blowers!
- To blow FAST! Small or large cores are blown —ready for removal, in but a *very few seconds!*
-

**MODEL 40-D-9**
**Full-Automatic**

Single control, automatic, electrically timed blowing cycle—automatic, electrically controlled refilling of sand magazine—automatic drawing of cores—automatic lubrication of all valves and clamping cylinders—automatic safety controls.

MEMBER FEMA

*See the San-Blo*

and other Federal equipment and supplies

**at BOOTHS 1429-1433**

A. F. S. INTERNATIONAL FOUNDRY SHOW

FEDERAL

DETROIT
CHICAGO
MILWAUKEE
UPTON, WYO.
LOS ANGELES

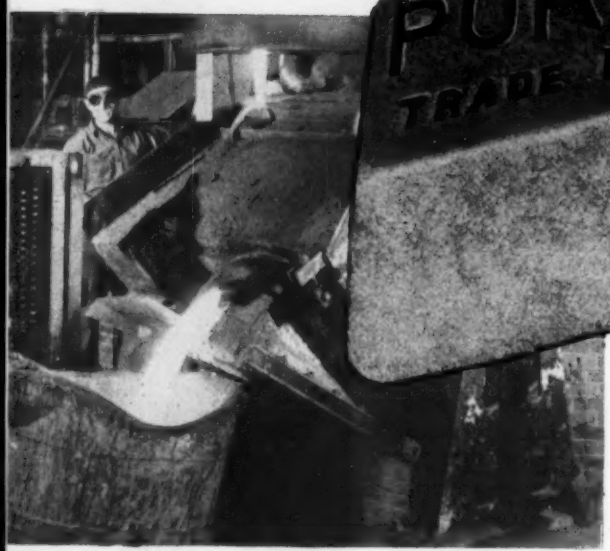
NEW YORK
RICHMOND, VA.
CROWN HILL, W. VA.
CHATTANOOGA
CLEVELAND

**THE FEDERAL FOUNDRY SUPPLY COMPANY**

4600 EAST 71st STREET • CLEVELAND 5, OHIO

# TO CUT CASTING LOSSES

*use*




*in every melt*

Every day, more leading foundries are using Purite *regularly* to cut casting losses and increase production of finished work. In these foundries, the use of Purite is standard operational procedure in every cupola charge. In the ladle too, Purite helps keep production high.

For over 30 years, Purite has been the choice of leading foundries everywhere. Here's why:

1. **Purite produces a higher percentage of finished castings per ton of metal poured.**
2. **Purite gives 100% fluxing action in the cupola—100% desulphurizing action in the ladle.**
3. **Purite gets to all the iron quicker.**
4. **Purite is time-tested and proven for unsurpassed desulphurizing uniformity.**
5. **Purite comes in 2-lb. pigs—no weighing or measuring required.**
6. **Purite is 100% pure fused soda ash—you do not pay for inert materials.**
7. **Purite does not crumble—no waste—no dust.**
8. **Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.**

Purite, the scientific flux for better melting and cleaner iron, is sold by all leading foundry supply houses in the United States and Canada. Mathieson Chemical Corporation, Baltimore 3, Maryland.

**Mathieson**
CHEMICALS

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

# American Foundryman

**april 1952** / *Volume 21 • Number 4*

OFFICIAL PUBLICATION OF THE *American Foundrymen's Society*

Atlantic City's Auditorium, largest in the world, will be the Mecca for free world foundrymen May 1 through 7 when it houses the 1952 A.F.S. International Foundry Congress & Show. Attractions for "Every Foundry in '52" will be a week-long program of top technical information, plus the huge Foundry Show, in which more than 250 top foundry suppliers will show their wares.


## Trends

83 Product and process developments
83 How new A.F.S. Headquarters will look

## International Foundry Congress & Show

84 Summary of Events
90 Partial List of Foundry Show exhibitors
92 Gold Medal Awards and Honorary Life Memberships
94 Featured speakers
96 Program
108 For the ladies
110 Congress hosts
116 Plant visitations
118 International authors
181 Exhibits Preview

## In the news

112 National Castings Council
119 Foundries meeting real challenge as S & H & AP Fund grows

## Technology

138 Practical Aspects of Olivine as a Molding Material
*John Sissener and Bjorn Langum*
143 Risering Castings
*J. B. Caine*

## Operations and methods

120 Standards for Rough Chipping and Removing Welds
*Dean Van Order*
125 Ventilation at Non-Ferrous Melting and Pouring Operations
*H. J. Weber*
132 Practical Suggestions for Building of Wood Patterns
*W. H. Siebert*
135 Quality Control Program for a Steel Jobbing Foundry
*H. H. Fairfield*

## People

43 *Foundrymen in the news*
106 *A.F.S. Officers and directors*
153 *A.F.S. Introduces*

## Departments

156 *Chapter news*
170 *Foundry tradenews*
199 *Book reviews*
200 *Abstracts*
202 *Coming events*
210 *Advertisers' Index*
211 *A.F.S. employment service*



### Publications committee

**H. M. St. John,** *Chairman*
Crane Co., Chicago
**C. H. Lorig**
Battelle Memorial Institute
**W. D. McMillan**
International Harvester Co., Chicago
**H. J. Rowe**
Aluminum Co. of America, Pittsburgh
**F. J. Walls**
International Nickel Co., Detroit

### A.F.S. Headquarters

*616 S. Michigan, Chicago 5*
**Wm. W. Maloney**
*Secretary-Treasurer*
**S. C. Massari,** *Technical Director*

### American Foundryman

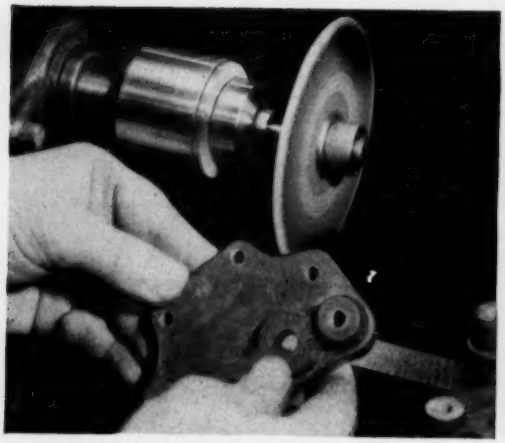
**H. F. Scobie,** *Editor*
**R. N. Sheets,** *Assistant Editor*
**H. F. Hardy,** *Editorial Assistant*
**Terry Koeller,** *Advertising Manager*
**Helen Dudek,**
*Advertising Production*
**LaVerne Lahn,** *Circulation*

### Advertising representatives

**Central**
R. E. Cleary, *Commercial & Savings Bank Bldg., Berea, Ohio.*
**Midwestern**
H. Thorpe Covington Co., *677 N. Michigan Ave., Chicago.*
**Eastern**
Robert B. Weston, *550 Fifth Ave., New York, N.Y. Plaza 7-0454.*

ABC

# SUPERLATIVE FOR



**STRAIGHT WHEELS**
...for removing flash from non-ferrous castings.

**MOUNTED WHEELS**
...for removing tool marks and scratches from finished surfaces.

# MX

the versatile, long life, self-cleaning, high strength, cushion-action abrasive

by CARBO

TRADE

*"Carborundum" and "MX" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, New York*

# CLEANING UP CASTINGS

**DEPRESSED CENTER WHEELS**
...for removing mold marks from non-ferrous castings.

**DISCS**
...for removing flash from cast iron housings. Also for removing fins between molded sections of castings.

**PRODUCTION CUT-OFF WHEELS**
...for cutting gates and risers from all types of non-ferrous castings.

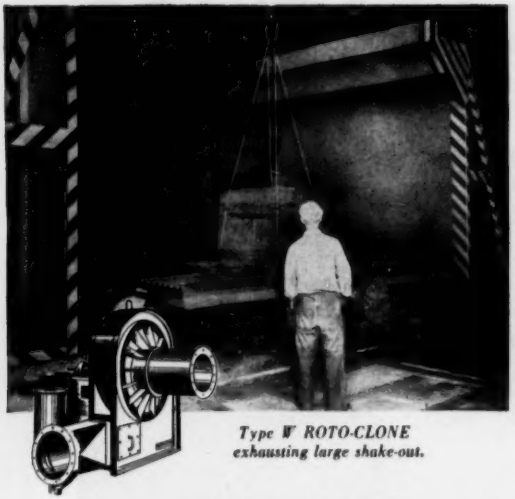
MX—one great product in 5 distinct forms—each one a superior cost-cutter for foundrymen everywhere!

The reason lies in the MX bond, tough yet resilient—it provides a fast-cutting action that's extremely soft and clean, yet rugged enough to perform many heavy-duty operations.

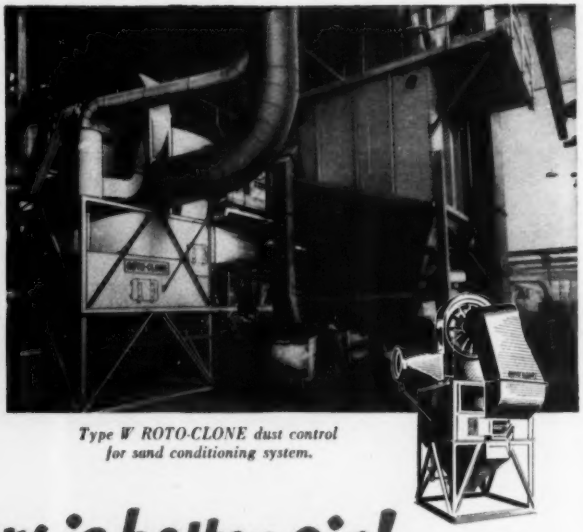
Get the MX story from your CARBORUNDUM or distributor salesman —or write Dept. AF 81-60.

**RUNDUM**
MARK

**offering ALL abrasive products...to give you the proper ONE**



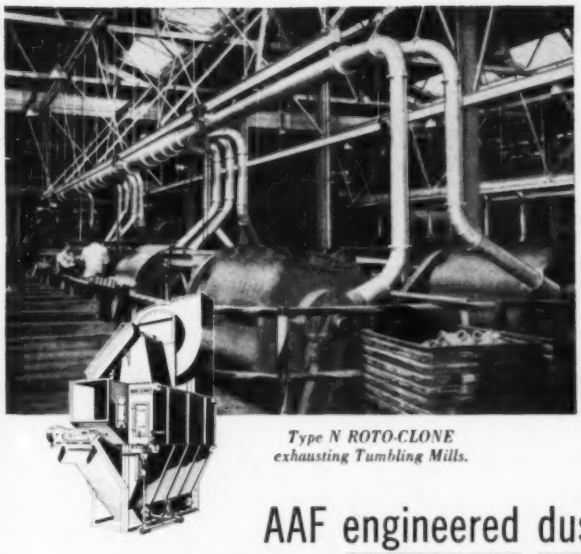
*Type W ROTO-CLONE exhausting large shake-out.*



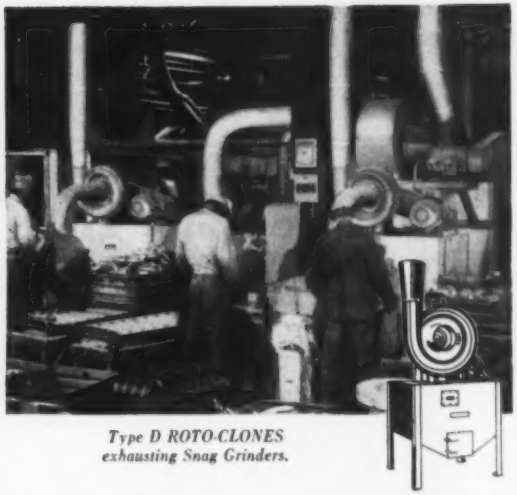
*Type W ROTO-CLONE dust control for sand conditioning system.*

# today's best buy is better air!

*Type D ROTO-CLONE applied to Swing Frame Grinding.*



*Type N ROTO-CLONE exhausting Tumbling Mills.*



*Type D ROTO-CLONES exhausting Snag Grinders.*

# AAF engineered dust control steps up foundry production...saves man-hours...cuts maintenance costs!

These ROTO-CLONE* dust collector applications are reliable testimonials to the benefits of clean air for increased production. They represent hundreds of installations across the country, where AAF "engineered dust control" has proved the efficient solution to foundry dust problems. The result has been better working conditions and more productive man-hours, improved mechanical efficiency and reduced costs for maintenance.

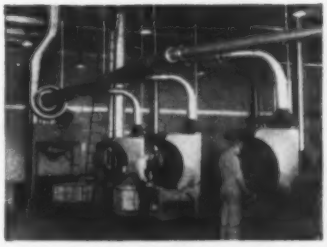
The many and varied dust sources in the foundry are one reason why so many have equipped with AAF ROTO-CLONE collectors. This broad line of AAF products available in many types, sizes and arrangements has efficiently eliminated dust from nearly every foundry source. For example—the three basic ROTO-CLONE types are Type D for dry collection, Type W for wet collection and Type N for hydrostatic collection. However, each of these ROTO-CLONE types is furnished in many sizes and capacities, and in several arrangements . . . the arrangement determining the method of disposal for the collected material.

Exclusive ROTO-CLONE engineering features provide these advantages • Each compact unit performs all three functions of exhausting, separating and storing dust • High efficiency collection over wide range of particle sizes in heavy concentrations • Elimination of secondary dust problem • Uniform air delivery • Low cost installation and maintenance.

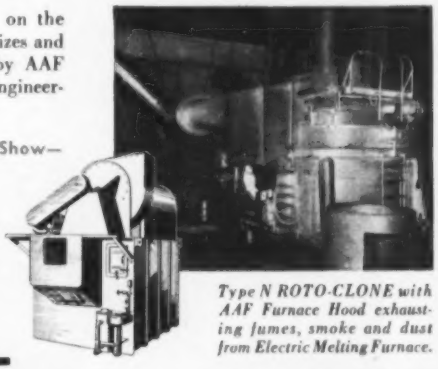
For complete information on the many ROTO-CLONE types, sizes and applications call your nearby AAF representative or write for Engineering Bulletin No. 270A.

Come and see us at the Show—
Booth 1550.

**ROTO-CLONE is the trademark (Reg. U.S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydrostatic precipitator types.*



*Type D ROTO-CLONE applied to Portable Grinding and Chipping.*



*Type N ROTO-CLONE with AAF Furnace Hood exhausting fumes, smoke and dust from Electric Melting Furnace.*

FEMA MEMBER

**American Air Filter**
COMPANY, INC.
104 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q. • Pacific Division Office, San Francisco, California

AAF

# BENJ. HARRIS & CO.

OVER 40 YEARS

PRODUCERS OF

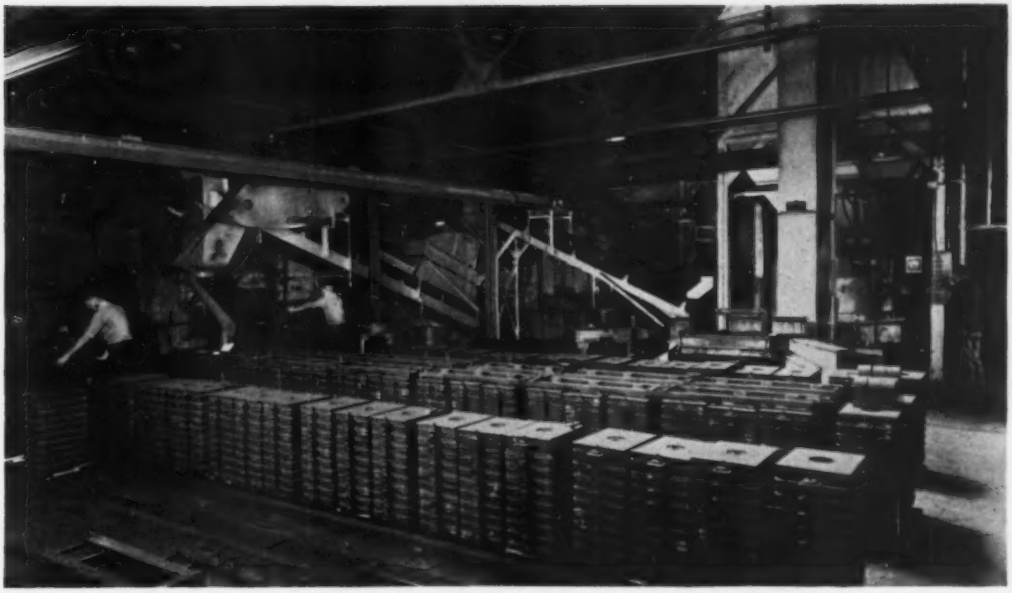
QUALITY BRASS & BRONZE

Ingot

PROMPT AND DEPENDABLE SERVICE

ALL COMMERCIAL & GOVERNMENT SPECIFICATIONS SPECIAL ALLOYS

GENERAL OFFICES AND PLANT AT CHICAGO HEIGHTS, ILL.



Link-Belt equipment at Cutler-Hammer foundry includes shakeout screen, bucket elevator, storage bin with vibrating screen (right); transfer belt conveyor, Revivifier and distributing belt conveyor (left).

# LINK-BELT mechanization
## pays dividends for foundries of all sizes

### Here's how one important foundry gets fast, clean, low-cost handling of sand and castings

WHETHER your foundry is large or small, mechanized handling of sand and castings offers two big advantages. First, you can produce better castings at lower cost. Equally important, you can make more efficient use of scarce manpower . . . eliminate much backbreak, improve working conditions.

For instance, consider Cutler-Hammer, Inc., Milwaukee. Their new Link-Belt-designed system prepares 15 tons of sand per hour for two stack molding machines. Careful planning has speeded production, provides good housekeeping. Central shakeout simplifies handling and sorting of castings. Despite low headroom, alterations were minor. And provision has been made for expansion.

For information on how mechanization can serve you, call the Link-Belt office near you. A Link-Belt foundry specialist will welcome the opportunity to work with you or your consultant.

Link-Belt Shakeout gives positive separation of sand and castings.

Ram-offs are minimized because sand is thoroughly aerated for easy flowing by Link-Belt Revivifier.

LINK-BELT

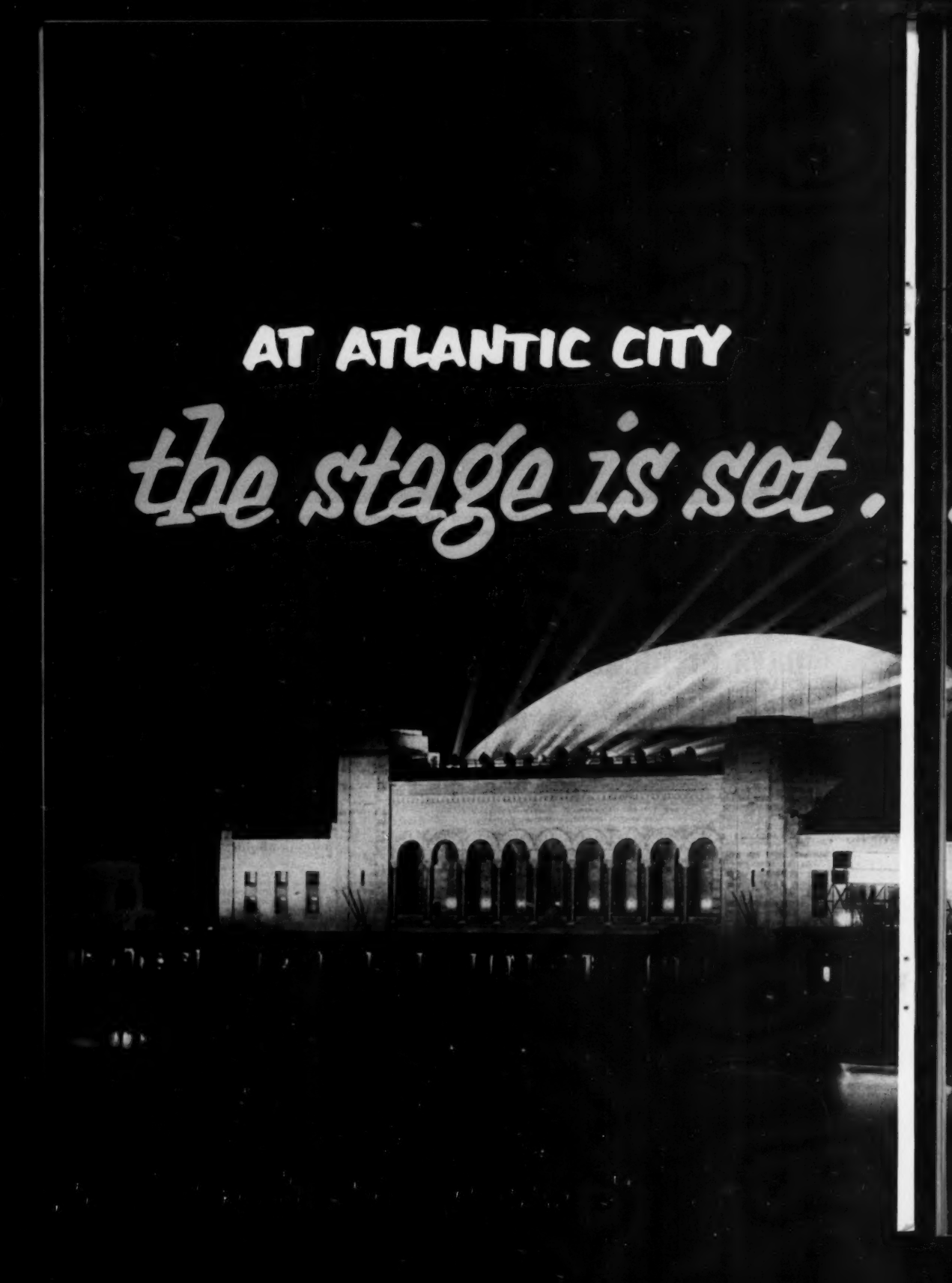
**Conveyors and Preparation Machinery**

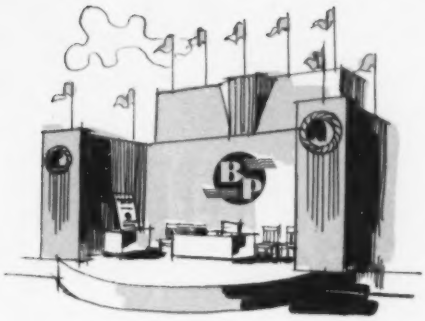
•

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,700

FEMA

SEE OUR EXHIBIT—INTERNATIONAL FOUNDRY CONGRESS—ATLANTIC CITY—MAY 1-7


AT ATLANTIC CITY
the stage is set.



# SEE THE B&P STAGE REVUE—

*featuring the NEW*

- AUTOMATIC HYDRA-SLINGER
- CHAMPION BLO-MATIC CORE BLOWER
- MAGNARATOR
- J&J JOLT SQUEEZE PIN-LIFT MACHINE

*and many other advanced machines by:*

**Beardsley & Piper • Johnston & Jennings • Champion**

**BEARDSLEY & PIPER**
Division of Pettibone Mulliken Corporation
2424 N. Cicero Ave. • Chicago 39, Illinois

ON STAGE AT ATLANTIC CITY—IT'S
**BEARDSLEY & PIPER**
FOR BETTER METHODS

# Cupoline your Cupolas...

*Cupoline Bondact Mix is proportioned for use in the Bondact machine. This combination makes contour patching simple, ends uncertainties of hand mixes, avoids joints and weak points. Moisture is easily controlled.*

## PUT CUPOLINE TO WORK WITH THE BONDACT MACHINE

Cupola patching with the BONDACT machine using Cupoline refractory is a continuous story of substantial savings. Smaller cupolas can be patched in as little as 10 minutes and the average cupola in less than 30 minutes.

Save yourself many cupola headaches. Get actual case histories of money-making conversion to the Bondact air placement method of patching cupolas... Better service than ever from three shipping points.

**EASTERN CLAY PRODUCTS**
DEPARTMENT
**INTERNATIONAL MINERALS & CHEMICAL CORP.**
20 North Wacker Drive • Chicago 6, Illinois

DIXIE BOND • BLACK HILLS BENTONITE
REVIVO BOND • REVIVO SUPER BOND
BALANCED REVIVO

E C P

BONDING CLAYS and EXCEPTIONAL FOUNDRY SERVICE

Since 1926

BONDACTOR EQUIPMENT • CUPOLINE REFRACTORY • DURA PRODUCTS

# Anyway you look at it...

# SAND CONTROL pays for itself

## It's simpler than you think

Modern foundry methods with close sand control are simple enough—even for the smaller foundries. These four units of Gordon-Campbell sand-testing equipment will serve to show that sand testing doesn't have to be drawn-out, complicated procedures.

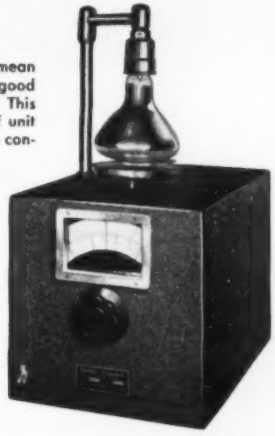
Guess methods of judging sand conditions are costly in scrap alone—cost more in a short time than will pay for real sand control. Look into Gordon-Campbell sand-testing equipment. You can turn a large percentage of your scrap into profits—and get better castings.

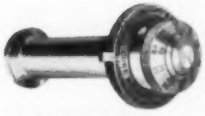
Gordon-Campbell
**Combination RAMMER-COMPRESSION TESTER**

Correct bond strength is vital to the production of good castings. This simple unit combines ramming of specimens for permeability tests and the testing of bond strength. Strength values are read direct on dial.

Gordon-Campbell
**MOISTURE TESTER**

Close moisture control can mean the difference between good castings and "scrap". This simple, accurate, foolproof unit quickly determines moisture content of sand.





Gordon-Campbell
**CORE HARDNESS TESTER**

Why gamble with cores of uncertain hardness? This simple tester shows positive hardness values in a few minutes.

Gordon-Campbell
**PERMTESTER**

To avoid the defects caused by poor venting of molds and cores the Permtester is essential to determine the permeability of molding and core sand mixtures. Permeability values are shown on direct-reading dial in a few minutes—no calculations.

## Other Gordon Campbell SAND-TESTING UNITS

**TRANSVERSE TEST CORE MAKER** for preparing core specimen for transverse tests.

**TRANSVERSE CORE TESTER** Quickly determines transverse strength of cores.

**CORE BAKING OVEN** Electrically bakes core specimens.

**SAND WASHER** The easy-to-use method to determine clay content of sand.

The Gordon-Campbell sand-testing units are made to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

***Free to any foundry man***

A booklet that takes the mystery out of foundry sand testing and control. Write for this simple discussion on common foundry-sand troubles and how to get away from them.

## CLAUD S. GORDON COMPANY

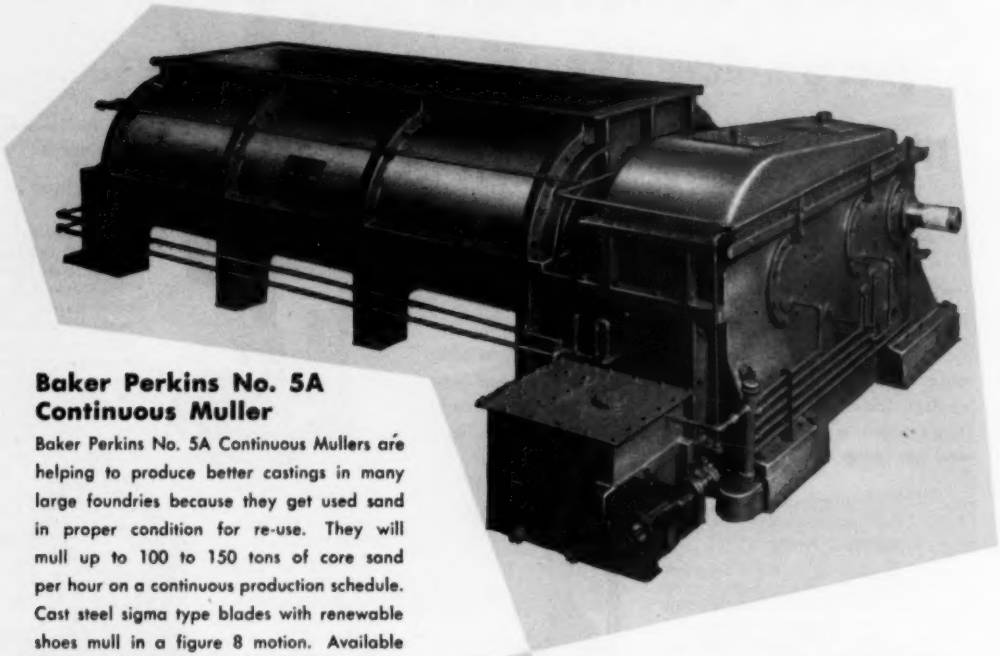
*Manufacturers & Distributors*

GORDON SERVICE

Metallurgical Testing Machines • Industrial Furnaces & Ovens • Temperature Control Instruments • Thermocouples & Accessories

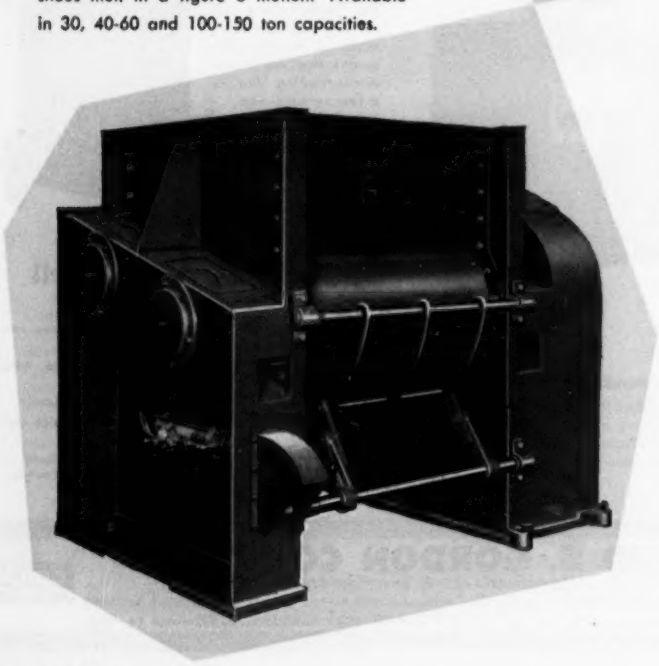
Dept. 18, 3000 South Wallace St., Chicago 16, Ill. • Dept. 18, 2035 Hamilton Ave., Cleveland 14, Ohio

# Two Baker Perkins sand handling units that help to improve casting quality



## Baker Perkins No. 5A Continuous Muller

Baker Perkins No. 5A Continuous Mullers are helping to produce better castings in many large foundries because they get used sand in proper condition for re-use. They will mull up to 100 to 150 tons of core sand per hour on a continuous production schedule. Cast steel sigma type blades with renewable shoes mull in a figure 8 motion. Available in 30, 40-60 and 100-150 ton capacities.



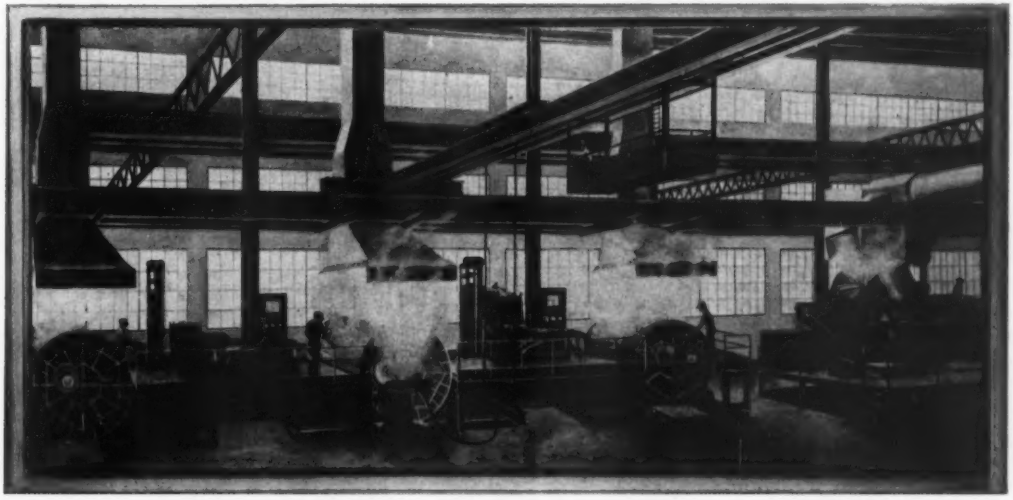
## Baker Perkins Unidor Core Sand Mixers

In smaller foundries these batch type mixers can help improve the core sand and thus give better casting quality. They rub, stir and knead all in one operation, distributing a thin layer of bond around each grain to assure 100% benefit from bonds, oils, binders and other compounds. Available in 5½ to 35 cu. ft. working capacities.

**BAKER PERKINS INC.**
**FOUNDRY EQUIPMENT SALES**
**SAGINAW, MICHIGAN**

224

# AJAX Induction Melting Furnaces — A Modern Tool for Industry



*This oil painting, 9 feet long in full color, by J. Gordon White, shows AJAX-SCOMET installation at Scovill Manufacturing Company, Waterbury, Connecticut.*

HERE IS A new tool for melting metal . . . Something that can concentrate enormous power in a small space . . . Something that can be adapted to accurate pouring, to precise temperature control, to inert gas protection, to high-grade refractories . . . A tool that can be used for all existing non-ferrous metals and alloys.

AJAX furnaces paved the way for continuous casting processes which lay dormant in old patents of farsighted inventors who thought ahead of their times. Junghans, with the help of the AJAX furnace, developed his continuous casting process at the Wieland Works in Germany before the last World War.

Scovill perfected the Junghans process in this country and is using AJAX-SCOMET furnaces of unprecedented size for melting, as shown in painting above. Nichols Wire & Aluminum Company used the first commercial Properzi machine for continuous production of aluminum wire from molten metal delivered by AJAX furnaces; U. S. Metals Refining Company is using AJAX-SCOMET furnaces for continuous casting of oxygen-free copper. Cleveland Graphite Bronze Company produce their famous stock for steel backed copper-lead bearings exclusively in AJAX melting furnaces. AJAX furnaces are used in many plants and research laboratories for continuous bonding aluminum to steel.

AJAX made the first furnace for galvanizing steel in a refractory lining with accurate temperature control. AJAX furnaces were instrumental in the realization of modern squirrel-cage aluminum rotor production. AJAX supplied the first commercial automatic pouring device for die-casting machines.

These few examples show how AJAX induction furnaces can be applied to modern manufacturing methods. Write us for further information.

AJAX TAMA-WYATT

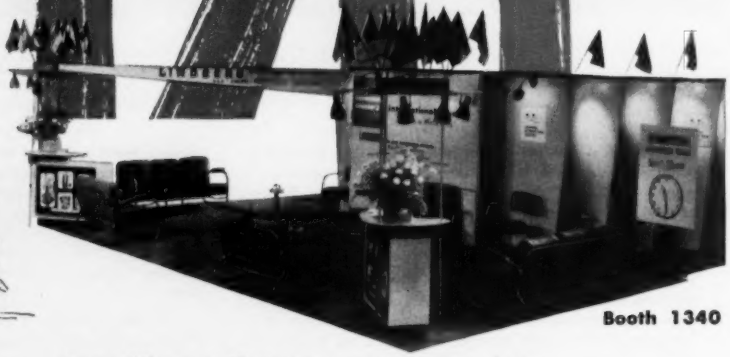
AJAX ENGINEERING CORP., TRENTON 7, N. J.

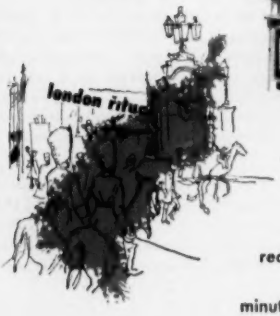
INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

# VISIT

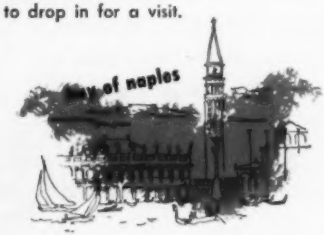
## THE LINDBERG INTERNATIONAL THEATRE






**Booth 1340**

A tour of Europe in 20 minutes . . . via the magic of stereo-realism (3-dimension color slides). Take the weight off your feet . . . the exhibits off your mind . . . and relax for 20 minutes. We'll take you to Paris, Stockholm, Milan, Brussels, Sorrento and many other world famous spots . . . and incidentally we'll show you a few slides of Lindberg-Fisher melting furnaces in operation. Be sure to drop in for a visit.



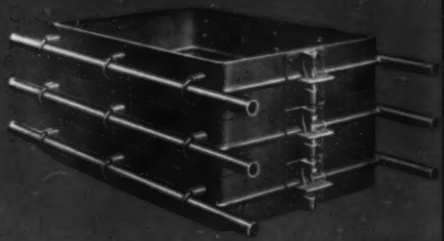

**LINDBERG-Fisher**

A division of Lindberg Engineering Co.
2463 W. Hubbard St., Chicago 12, Illinois

# Sterling STEEL FLASKS

## Product of 43 Years Specialized Experience

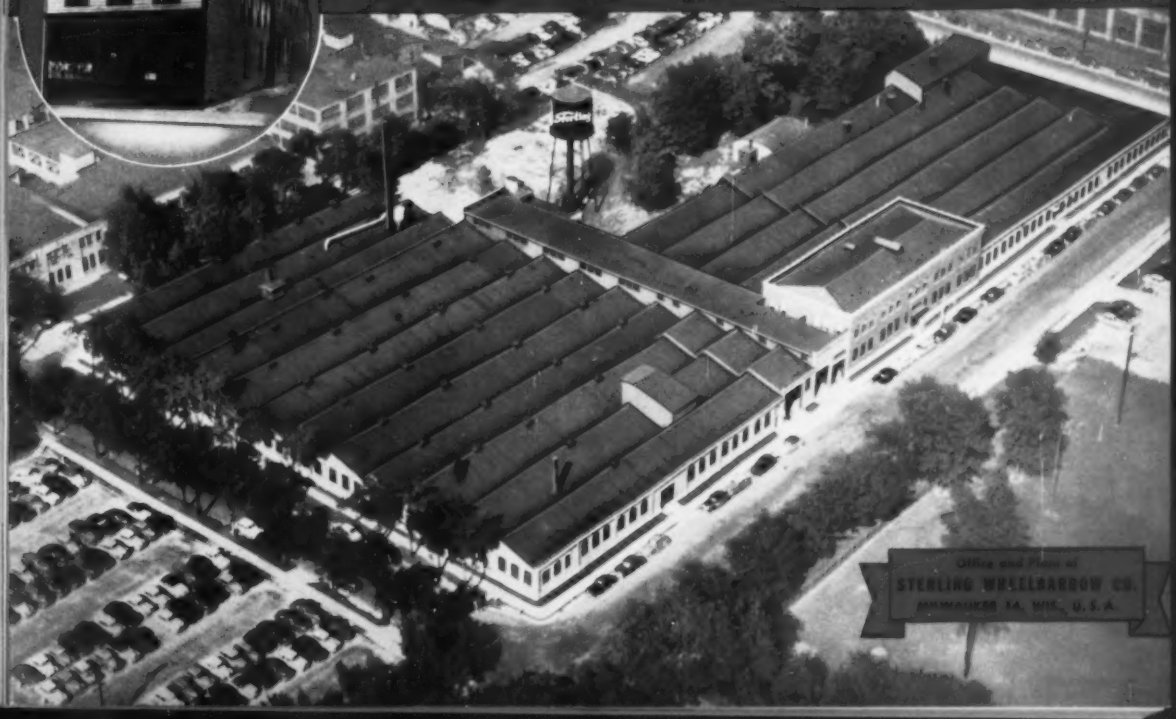
More than 4300 foundries have adopted Sterling Steel Flasks for greater efficiency, longer life and more profitable foundry operation. The reason is obvious. Every Sterling Flask is backed by almost a half-century of specialized experience fabricating foundry flasks and equipment to the highest quality standards. The Sterling reputation for correct design and excellent workmanship is known throughout the industry. The next time you have a flask problem, consult Sterling. Our branch office near you will gladly give you information and estimates—or write directly to the Sterling factory at Milwaukee.



Sterling old-timer produced about 40 years ago. The pins along the sides acted as a reinforcement and also served as lifting handles.

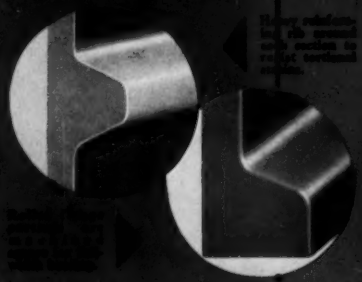
Modern Sterling heavy-duty steel flaskset with double pin lugs, cast steel trunnions, steel stamping bars, malleable clamps and special reinforcing bars on cope and drag.

Illustration at left shows the original Sterling factory and office built in 1890. Illustration below shows the modern, spacious Sterling plant today.



# Sterling STEEL FLASKS

## . . . . the *Original* and *Only* Rolled Steel Channel Flask

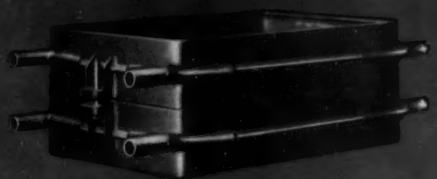


You can produce BETTER CASTINGS, at a LOWER COST per casting, with dependable Sterling Flasks. Sterlings are fabricated from special rolled steel channel into one solid rigid piece. They withstand tremendous pressures, year after year, and have the strength and rigidity to resist distortion. Sterling originated the famous rolled steel channel construction back in 1909 and has devoted almost a half century in developing and perfecting this popular type of foundry flask. Write today for copy of Sterling Catalog No. 64.

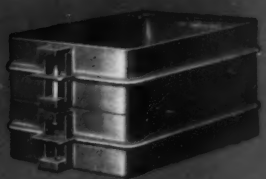
Style 96 NS-RT Flask with Simplex Pin Lugs and Cast Steel Trunnions.

Style "HS" with Forged steel Pin Lugs and Handles Combined.

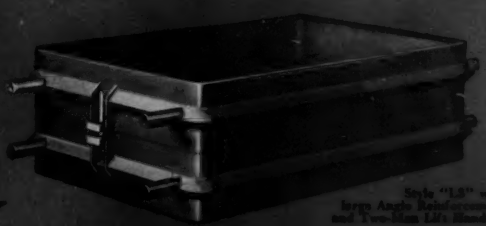
Style "H" with two pairs of Pin Lugs Welded on each Side.



Style "OSX" with Simplex Pin Lugs, Two-Man Lift Handles and Reinforced Corners.



Style "AD" with Double Pin Lugs and Flat Steel Handles.



Style "LS" with large Angle Reinforcement and Two-Man Lift Handles.

## Sterling FOUNDRY EQUIPMENT

*for Heavy-Duty Foundry Work*

No. DF4-S Heavy-Duty Wheelbarrow.

No. 110 Core Truck.

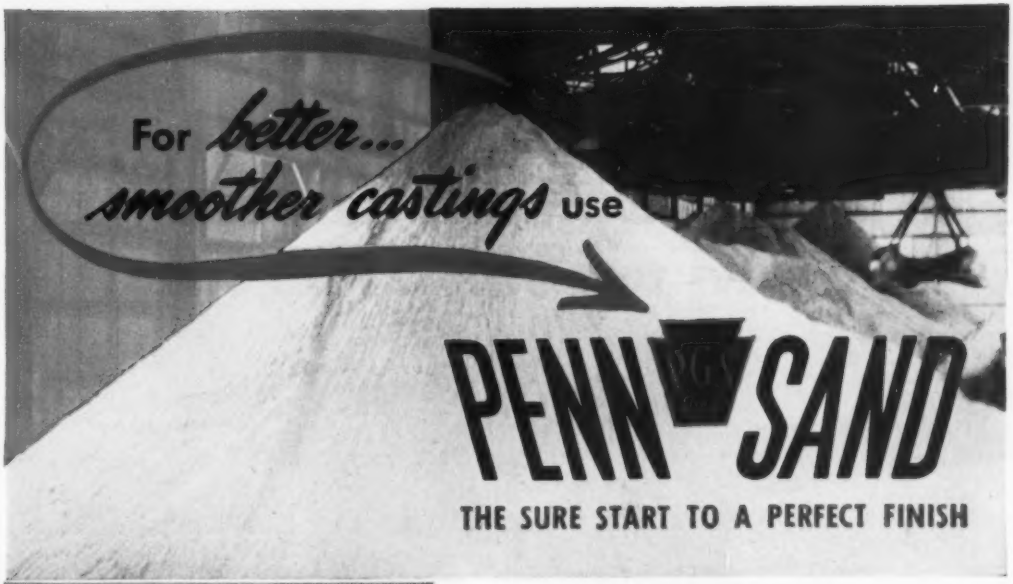
No. 160 Heavy-Duty Casting Truck.

Also Flask Pins (all types) . . . Hardened Steel Bushings . . . Malleable Clamps . . . Steel Bottom Boards . . . Steel Core Plates . . . Squeeze-in Boards . . . Upsets . . . Bands . . . Slag Buggies . . . Casting Carts . . . Steel Wheels . . . Various Types of Wheelbarrows.

See Our Exhibit at the Atlantic City Show — Booth No. 1618

STERLING WHEELBARROW CO., Milwaukee 14, Wisconsin, U.S.A.

CHICAGO • BUFFALO • CLEVELAND • DENVER • NEW YORK • PHILADELPHIA • ST. LOUIS




- MOLDING SAND
- CORE SAND
- SHELL-MOLDING SAND
- SAND BLAST SAND
- SILICA FLOUR

WASHED, DRIED and SCREENED GRADES For

- Steel
- Gray Iron
- Malleable
- Brass
- Bronze
- Aluminum

and Magnesium Castings

**VISIT OUR EXHIBIT IN BOOTH 234**
**AT THE INTERNATIONAL FOUNDRY SHOW**
**ATLANTIC CITY, MAY 1-7**

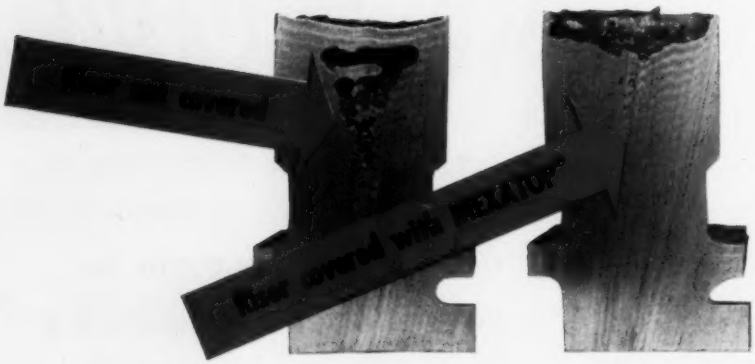
Find out how you can get better finish and higher permeability with the same sand—PENN SAND. Unique grain structure and distribution give PENN SAND built-in lower density, which in turn results in both lower confined expansion and higher permeability. These inherent advantages save you time and money by reducing rat tails, veining, scabbing, buckles and other defects.

**PENNSYLVANIA GLASS SAND CORP.**
GATEWAY CENTER • PITTSBURGH, PA.
Eastern Sales Offices, TRENTON TRUST BUILDING, TRENTON, NEW JERSEY

Copyright 1952 Pennsylvania Glass Sand Corp.

# use MEXATOP®

## GET HIGHER YIELD... LOWER SCRAP LOSS AND IMPROVE YOUR STEEL CASTING QUALITY




See us at the AFS International Foundry Congress and Show—
BOOTH 1626

- MEXATOP forms an insulating cover on the molten surface of casting risers . . . keeps the riser metal fluid longer
- MEXATOP will not affect casting analysis
- MEXATOP is easy to apply and costs only about ½¢ per 6-inch riser.
- MEXATOP has been proved in use by America's largest steel producers . . . let us arrange a test and prove it to you.

For complete information, write for new bulletin today.

167

## THE UNITED STATES GRAPHITE COMPANY

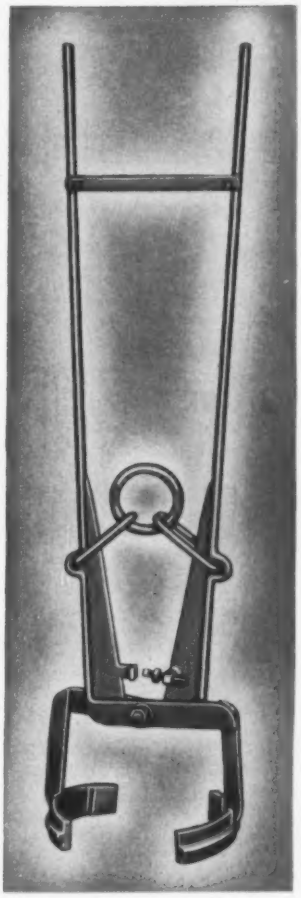
DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

## NO. 1 SOURCE FOR

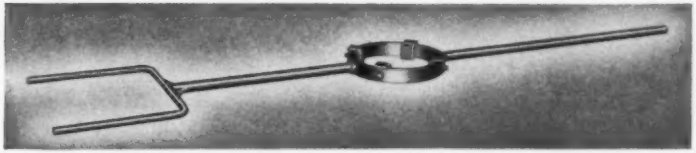
# Bowls · Shanks · Tongs

Industrial Equipment round bottom pressed steel ladle bowl, 50 lb. capacity, type 7 flat side.

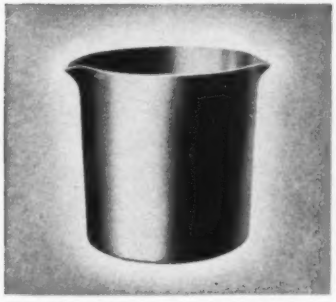
Industrial Equipment round bottom pressed steel ladle bowl, 60 lb. capacity, type 14 circular.



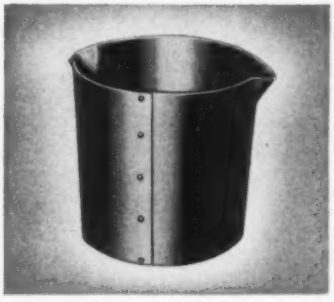
Type 72C crucible tongs. Adjustable. Four-point suspension. Claw types also available.



Industrial Equipment type 30CA single and adjustable ladle and crucible shank. Four-point suspension . . . easily adjustable . . . no springs . . . air cooled band. Fixed band types also available.



Industrial Equipment type 514 flat bottom welded steel ladle bowl. Available in almost any size or thickness.



Industrial Equipment 537 flat bottom riveted steel ladle bowl.

The above Industrial Equipment products, along with dozens of other types of bowls, shanks, tongs and ladles, are included in our latest catalog. *Write for your copy.*

LADLES

SHANKS

BOWLS

TONGS

**Industrial**

**EQUIPMENT COMPANY**

**115 NORTH OHIO ST., MINSTER, OHIO**

# Why do America's Largest Foundries

Plate Radiator Chaplets

Chills, Freight Car Side Frame

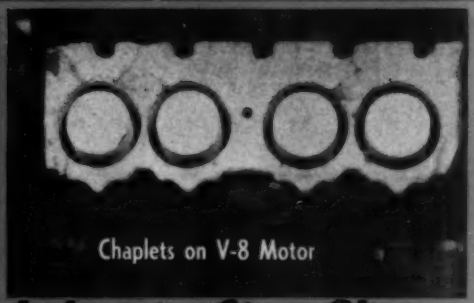
# Use FANNER CHAPLETS & CHILLS?

Super-Chills, Foundry Flask Mold

Anchoring Chaplets, 70' Casting

# For the Complete Answer, come to . . .

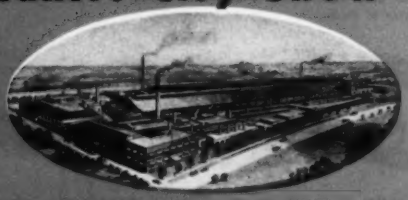
Setting Wire Chill Coils



Chaplets on V-8 Motor

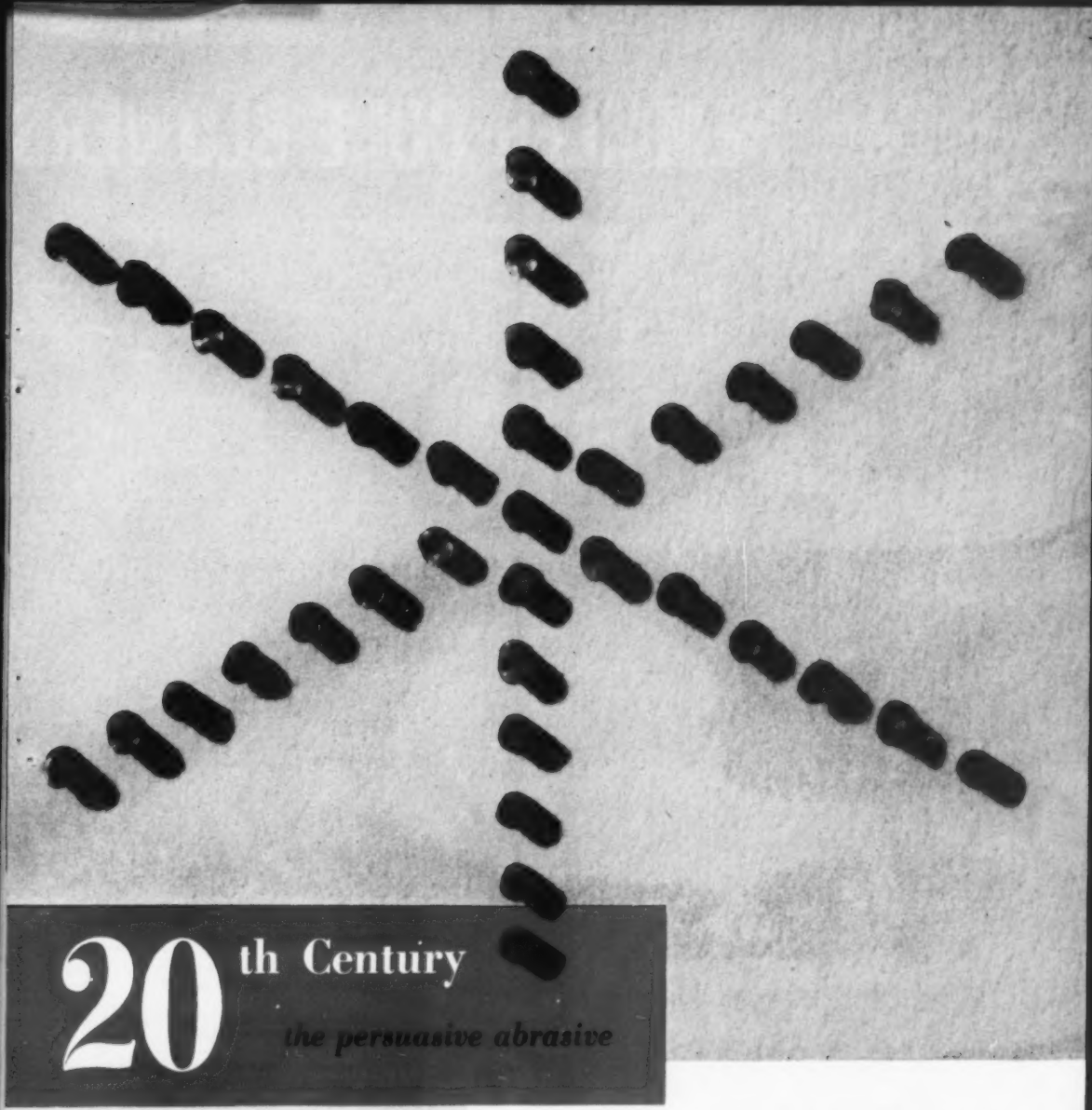
# Booth 1721, at the Atlantic City Show

**Come to Booth 1721** at the Atlantic City Show and see our display—and the much-talked-about Fanner Chaplet and Chill motion picture with its interesting story of their use in all types of foundries . . . learn why Fanner Chaplets and Chills are used by America's leading foundries . . . find out how they save money, reduce rejects, increase casting efficiency. Consult with the Fanner Engineering staff of specialists about application of Fanner Chaplets and Chills to your particular problem. We'll be looking for YOU.



## THE FANNER MANUFACTURING CO.

Brookside Park, Cleveland 9, Ohio — In Canada: The Canadian Fanner Co., Ltd., Hamilton, Ontario



# 20th Century

*the persuasive abrasive*

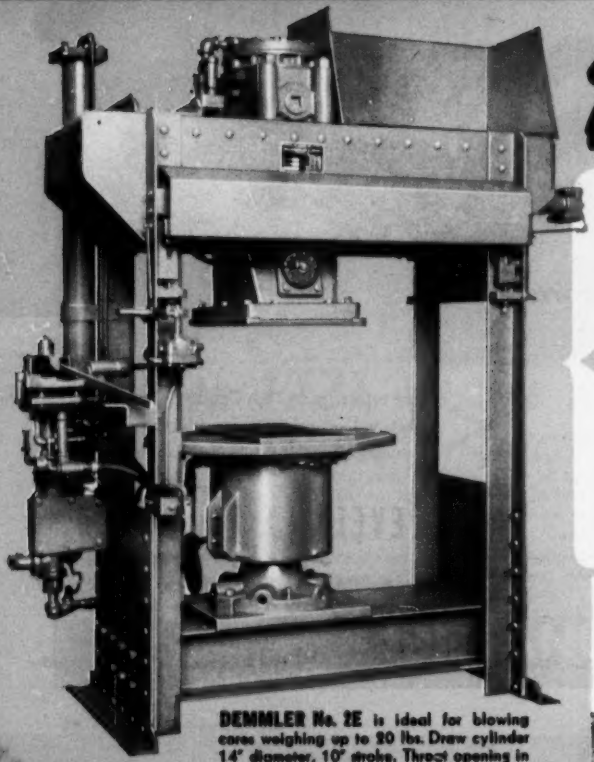
Any reference to 20th Century Drawn Steel Shot will emphasize its highest quality, economy and ability to stand hard use.

**THE CLEVELAND Metal Abrasive CO.**

801 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

One Of The World's Largest Producers Of Quality Abrasives
Normalized (Copyrighted Trade Name) - Hard Iron - Cut Wire - Powder

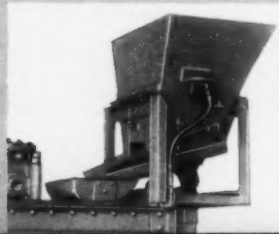
# 32 DEMMLER CORE BLOWERS



**DEMMLER No. 2E** is ideal for blowing cores weighing up to 20 lbs. Draw cylinder 14" diameter, 10" stroke. Throat opening in carriage 7" diameter.

## Better 8 Ways

1. Ultra high speed blow valve action — increasing initial blow pressure 25% above other machines.
2. Magazine exhaust valve — extra large size — quick acting — immediately exhausts air from magazine after core is blown.
3. Carriage rails — on outside of machine frame — out of sand area — where drawing accuracy would be impaired.
4. Leveling adjustment — 4 screw adjustment for complete adjustment of core box to draw — EASILY ACCESSIBLE.
5. Completely enclosed drawing post — drawing accuracy within thousandths — protected from sand and abrasion — assuring long, trouble-free life.
6. 2 speed hydraulic draw control — low speed while vibrator is acting and quick drop after core is drawn.
7. Hard, chrome plated valve seats—insure against rust and deterioration.
8. All parts of machine easily accessible for low maintenance costs.



**DEMMLER** Vibratory Sand Feeders increase core blower production as much as 25%! Sand stored in large hopper flows like water while vibrators are operating. Powered by rotary type pneumatic vibrators. Ends poking sand nuisance!

# help speed *Studebaker* production

The efficient manner in which Studebaker doubled capacity of their foundry is a well known story to the trade today.

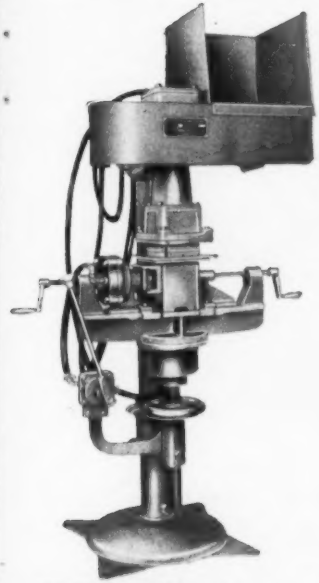
It pays tribute to the alert minds and capable hands for which the South Bend plant has long been known.

We at DEMMLER are gratified that these progressive Studebaker people have come to depend to a large extent on DEMMLER core blowers for their enviable record of fast, economical production of quality cores.

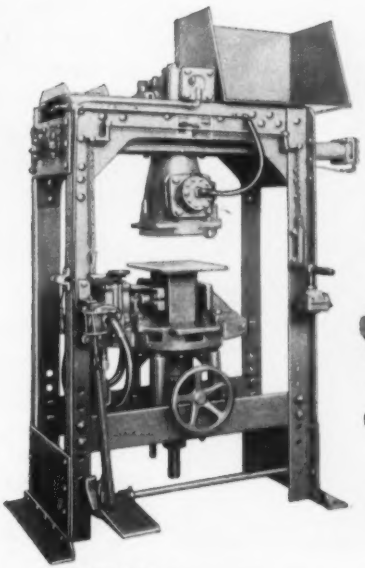
*Thirty two DEMMLER core blowers are now in service at Studebaker!*

Foundries everywhere have found that DEMMLER core blowers, because of their many outstanding features, are the wisest core blower investment on the market today!

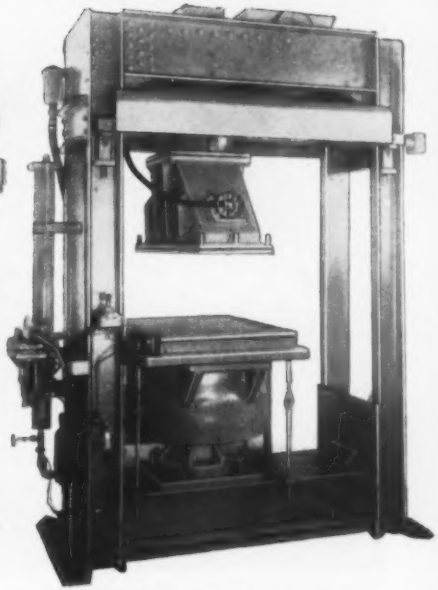
That's because DEMMLER core blowers—and only DEMMLER Core Blowers — offer you all eight of the important design features by which core blower value is determined.



**DEMMLER No. 55** provides answer to fast, economical production on short run jobs! One hand valve operates both vertical and horizontal core box clamps. Capacity, cores weighing up to 5 lbs.



**DEMMLER No. 1** is general purpose machine. Vertical clamping diaphragm, 10½" diameter. Capacity, 8 to 10 pound cores. One of the most popular core blowers ever built.



**DEMMLER No. 4E** handles cores weighing from 35 to 250 lbs. and up in weight. Draw cylinder 20", 22" or 26" diameter, 10" stroke. Throat opening in carriage 13" diameter.

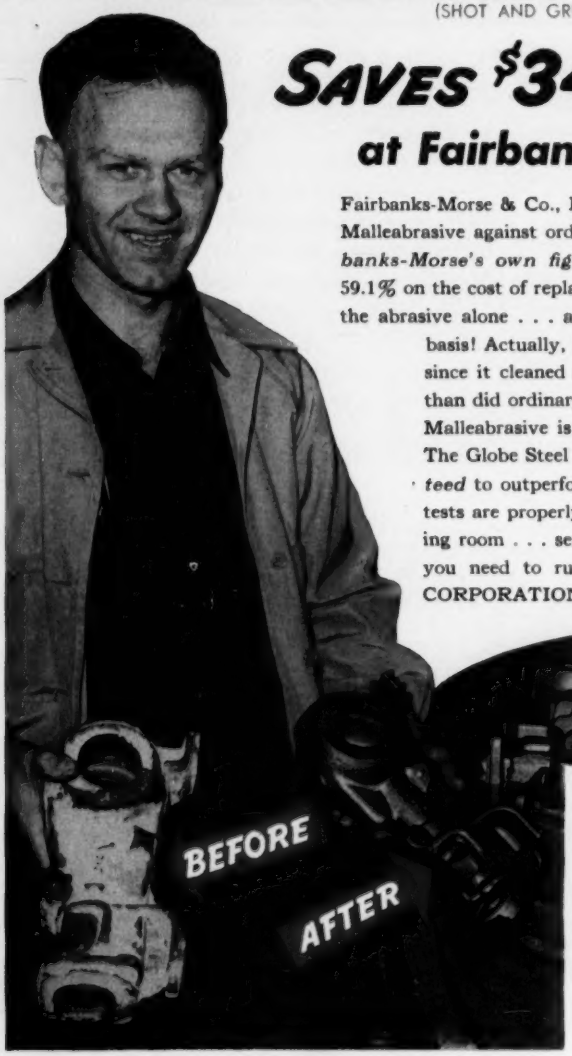
*speed plus dependability*

## Wm. DEMMLER & BROS., Kewanee, Illinois

MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

# MALLEABRASIVE®*

(SHOT AND GRIT)




## SAVES $3450.00 A YEAR at Fairbanks-Morse & Co.

Fairbanks-Morse & Co., Freeport, Ill., took us up on our offer to test Malleabrasive against ordinary grit in their own shop. Here are *Fairbanks-Morse's own figures:* During the test, Malleabrasive saved 59.1% on the cost of replacement parts . . . saved 14.6% on the cost of the abrasive alone . . . adding up to a total of $3454.40 on a year's basis! Actually, Malleabrasive's advantages are even greater, since it cleaned an average of 10.8% more tonnage per hour than did ordinary grit!

Malleabrasive is the *original* long-life abrasive pioneered by The Globe Steel Abrasive Co., Mansfield, Ohio. It is *guaranteed* to outperform ordinary shot and grit when comparative tests are properly run. Test Malleabrasive in your own cleaning room . . . send for your free kit, containing all the forms you need to run this impartial test. Write: PANGBORN CORPORATION, 1300 Pangborn Blvd., Hagerstown, Md.

Here's why Malleabrasive saves you money:

**MALLEABRASIVE**

- *is designed for modern cleaning equipment*
- *wears out fewer machine parts*
- *lasts 2 to 4 times longer*
- *reduces machine down-time*
- *reduces cleaning costs up to 50%*
- *increases output of cleaned castings*

Packed in orange striped 100 pound bags with this tag

***Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment***

**Pangborn**

**BLAST CLEANS CHEAPER**
**with the right equipment for every job**

*U. S. Patent #2184926 (other patents pending)

# An Heritage of skill in a craft

Peter Vischer, the great bronze founder, was a Fifteenth Century Guild Master and responsible for some of the most artistic castings that are today looked upon as examples of all time expert design and workmanship.

As a boy Peter worked as an apprentice with his father. In those days every youth destined for a certain trade had to be apprenticed to a Master who was responsible for his education.

This tradition has been carried on through the centuries—and today in our own plant we have many sons working along side of their experienced fathers. As an example, here is an illustration of Master Craftsman Ben Szymanski and his well-taught and equally accomplished son George B. Szymanski.

**PETER VISCHER**
*The Craftsman*
St. Sebald's Church
Nürnberg

PERMANENT MOLDS • WOOD AND METAL PATTERNS • KELLER AND DUPLICATOR WORK • MACHINE WORK • MALLORY METALS BERYLLIUM COPPER • MONEL METAL • EVERDUR CASTINGS COPPER CASTINGS OF HIGHEST ELECTRICAL CONDUCTIVITY • BRASS, BRONZE AND ALUMINUM CASTINGS

## CITY PATTERN
FOUNDRY AND MACHINE CO.

**1161 HARPER AT RIVARD • DETROIT 11, MICHIGAN**

More BS&B Foundry Flasks join those already in use at the recently enlarged Riverside Foundry Company . . . Bettendorf, Iowa. Castings of various types and sizes leave Riverside for delivery to large users in many sections of the nation.

# RIVERSIDE FOUNDRY COMPANY

## *Triples space and production facilities and adds STILL MORE* BS&B FOUNDRY FLASKS

Our friend and customer, the Riverside Foundry Company, Bettendorf, Iowa, *is right* . . . as are so many users, in again specifying BS&B Foundry Flasks.

Right—because BS&B flasks designed for a production foundry like Riverside are sturdily constructed to withstand continued use under hard working conditions and vigorous shake out . . . economical too!—cost records kept by many foundries prove BS&B flasks withstand more castings per flask throughout their service life. BS&B was again selected by Riverside because our flasks are built to specifications to stand the kind of use and abuse given them in a production foundry. Formed cold from full-gauge steel plate, they're heavy duty all the way through; fabricated for service with very little, if any, maintenance.

### A BS&B EXCLUSIVE

BS&B is the only fabricator to combine the following features in a heavy duty flask—welding of bearing strips, both inside and out . . . cast steel trunnions . . . cast steel pin lugs and clamp lugs.

### FULL BEARING

Level control is assured in the BS&B flask . . . full bearing to allow for pin lift operation. BS&B Foundry Flasks are tailor made to meet the requirements of a particular foundry or operation. Any type of pin and bushing arrangement can be supplied to meet customer requirements. We can deliver, without long waiting periods, light, medium, or heavy duty flasks—round, square and rectangular shapes.

### BS&B FOUNDRY FLASK HANDBOOK

Your free copy will be sent you promptly—just write. A handy catalog and useful foundryman's "bible" . . . contains complete diagrams, specifications, tables and all pertinent information on BS&B Foundry Flasks as well as easy-to-order system.

FOUNDRY BS&B FLASKS

**BLACK, SIVALLS & BRYSON, INC.**

Foundry Flask Division
Dept. 7-AQ4
7500 East 12th Street
Kansas City 3, Missouri

We'll be there . . . INTERNATIONAL FOUNDRY CONGRESS AND SHOW, American Foundrymen's Society, Atlantic City Convention Hall May 1-7. Please visit us at our exhibit booth..space 224..We'll display samples of equipment of interest to you; and BS&B representatives will be on hand to talk foundry flask problems and applications. BS&B PERSONNEL WILL BE HEADQUARTERED AT THE RITZ CARLTON HOTEL

# 100% RETURN ON INVESTMENT in one year

## with WHEELABRATOR®

### AIRLESS BLAST CLEANING

**LENNOX FURNACE COMPANY,** Marshalltown, Iowa replaced nine tumbling mills with a Wheelabrator Tumblast for cleaning gray iron furnace castings. Within a year savings effected through lower cleaning costs and faster production were sufficient to pay for the entire investment. Since that time they have been getting a daily bonus of $35.36.

**CLEANING TIME SLASHED 80%** — The Wheelabrator cleans as much work in 15 or 20 minutes as could be done in an hour and three quarters in tumbling mills.

**SAVES 29 MANHOURS DAILY** — Two men clean 17 tons of furnace castings in 16 manhours where five men previously worked a total of 45 hours to clean 16 tons.

**IMPROVES CASTING APPEARANCE** — Carl Cordt, Foundry Superintendent, sums up the advantages of the Wheelabrator as follows: "It is so much cleaner, so free from noise as compared with the old method, and so much more efficient in the manner in which it cleans the castings that I am surprised now how we ever got along without it."

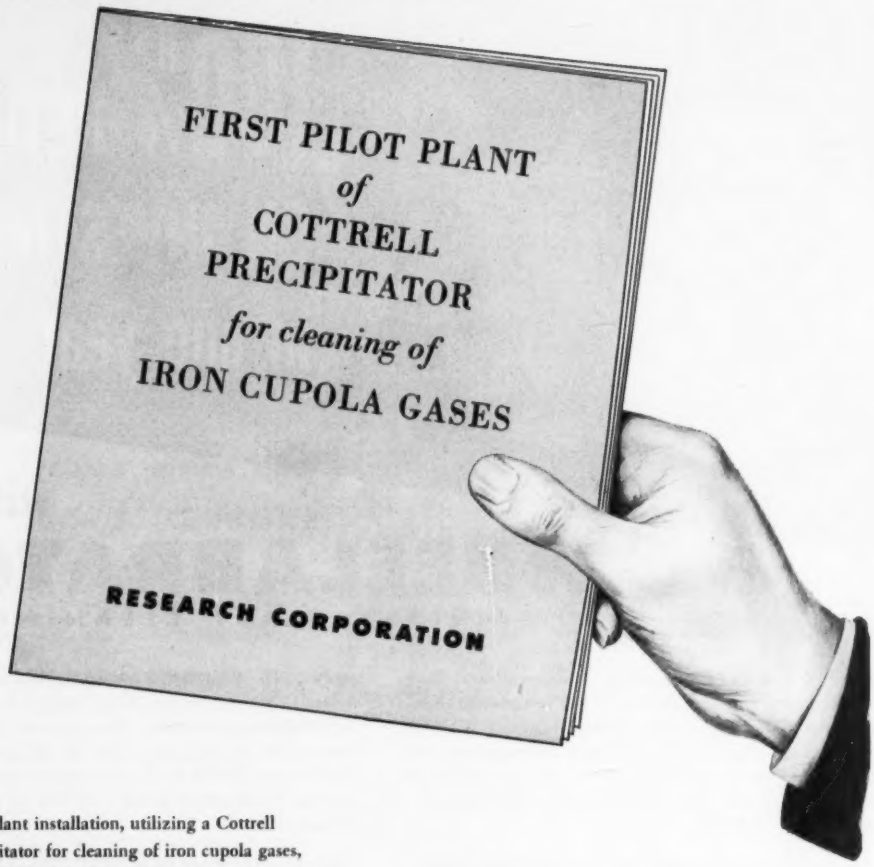
**HERE'S HOW YOU CAN SAVE** — Based upon the results of thousands of installations, Wheelabrator airless blast cleaning probably can make the same savings for you. An expert analysis of your cleaning problems by one of our engineers will give you complete facts on the results Wheelabrating will provide. There's no obligation, of course. Write for details.

**WHEELABRATOR** — The perfected airless centrifugal blast unit pioneered by ***American*** slashes cost and cleaning time. Conserves power, labor, space. Cleaning perfection results in longer tool life, faster machining and grinding, easier inspection.

*American*
WHEELABRATOR & EQUIPMENT CORP.
630 S. Byrkit St., Mishawaka, Indiana

**WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT**

# *News on a New Process*




**The first pilot plant installation, utilizing a Cottrell Electrical Precipitator for cleaning of iron cupola gases, had resulted in detailed findings of industry-wide importance. On the basis of facts unearthed about cupola operation and the study of the design factors involved in this project, foundries have already placed orders for 15 precipitators with Research Corporation.**

**Ask your Research Corporation representative to go over the findings of this first pilot plant installation with you. His recommendation on your specific problem is based on 39 years of experience in the design and erection of over a thousand Cottrell Electrical Precipitators.**

**RESEARCH CORPORATION**

*405 Lexington Avenue*
*New York, New York*

*122 South Michigan Avenue*
*Chicago 3, Illinois*

*Bound Brook, New Jersey*

RC-193

## FUSION POINT UNKNOWN!

The hottest blowtorch ever devised (temperature of jet: 5500°F.) wouldn't melt Stevens Ceylon Plumbago. According to the International Critical Table, Plumbago can withstand heat greater than 6300°F. Is it any wonder Stevens Plumbago is a foundry favorite?

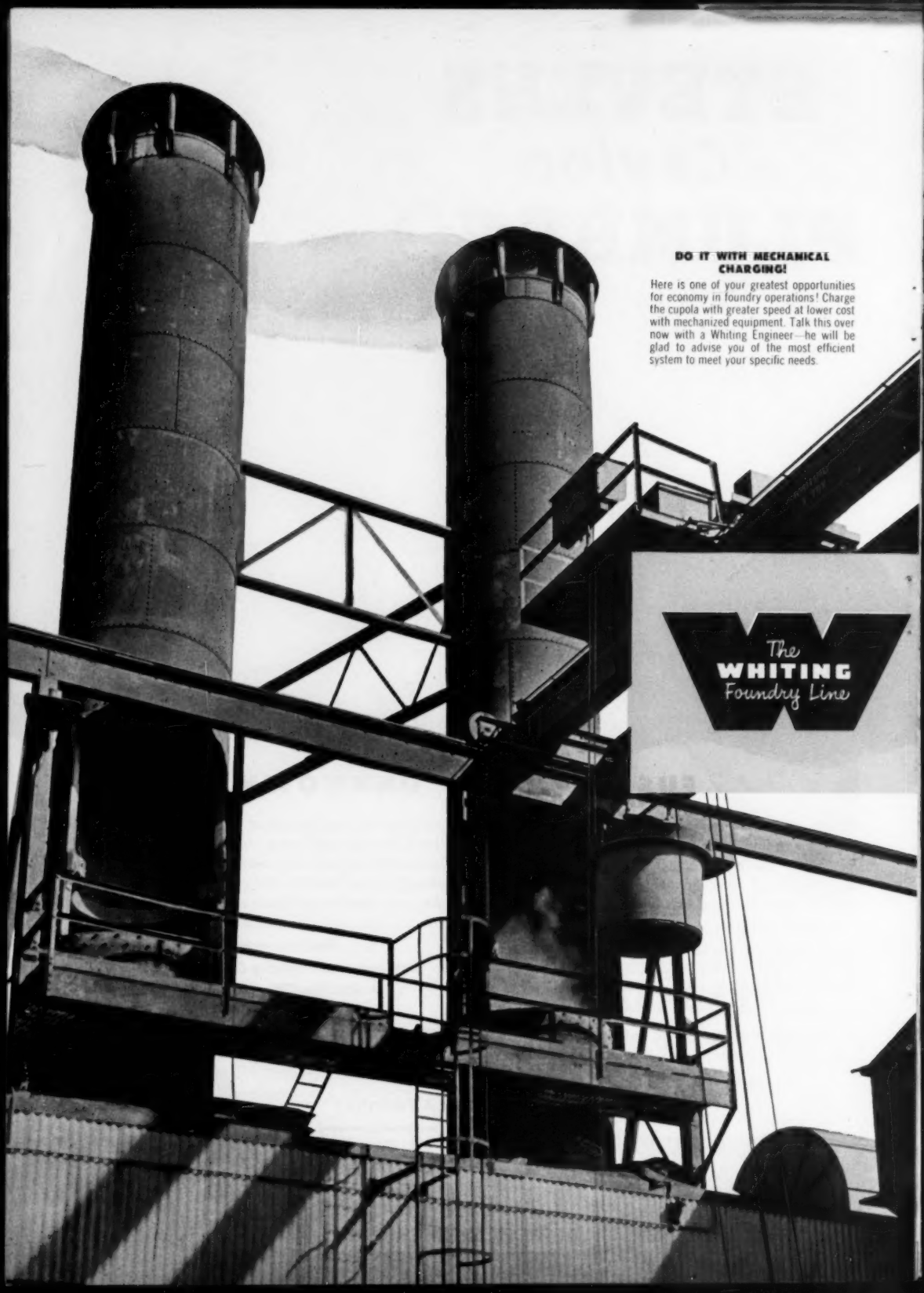
It can be used dry as a mold coating—can be mixed with molasses water and used as a mold wash—can be added to core washes to increase heat resistance—can be used as an additive to sand to make it easier to ram and give a heat resistant coating on each sand grain.

Let us show you how Stevens Plumbago can help improve your castings. If you will send us the data on your particular type of operation, we will make our recommendation and send you a working sample of the grade best suited for your requirements. Or, better still, order on approval a barrel of the grade we recommend. If it does not give full satisfaction, return it for full credit.

**Visit our exhibit at the International Foundry Congress and Show, Atlantic City, May 1-7, 1952 BOOTH 1718**

"EVERYTHING FOR A FOUNDRY"
TRADEMARK

FREDERIC B. STEVENS INCORPORATED
DETROIT 16, MICHIGAN
BUFFALO · CHICAGO · CLEVELAND
INDIANAPOLIS · NEW HAVEN
Representatives in Other Principal Cities
FREDERIC B. STEVENS OF CANADA, LTD.
WINDSOR · TORONTO
ONTARIO

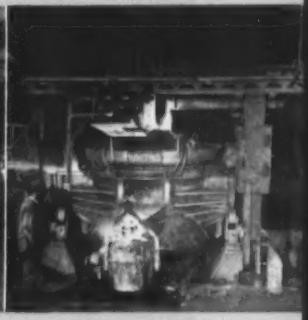

DO IT WITH MECHANICAL CHARGING!
Here is one of your greatest opportunities for economy in foundry operations! Charge the cupola with greater speed at lower cost with mechanized equipment. Talk this over now with a Whiting Engineer—he will be glad to advise you of the most efficient system to meet your specific needs.
The WHITING Foundry Line

# for increased production

# at lower cost . . .

# Mechanize Now!

(Here's how Whiting can help you!)



**DO IT WITH MECHANIZED MAKE-UP!**

Get a smoother flow of materials from freight car to cupola! Consider Whiting Cranes for unloading, Batch Weigh Hoppers and Iron Loading Platforms for accuracy in make-up, Scales and other equipment for low-cost operation.

**DO IT WITH OVERHEAD HANDLING!**

Save space, manpower and money with a Whiting Trambeam Overhead Handling System. Speed up pouring by moving ladles faster, easier and safer. Look into Trambeam now—it will increase your foundry capacity.

**DO IT WITH CUPOLA-TO-AIR FURNACE DUPLEXING!**

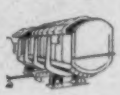
Cut costs, obtain a continuous supply of hot metal and improve control by duplexing from cupola to Air Furnace. Let us give you full information on this important process for higher strength, finer grain castings.

**DO IT WITH CUPOLA-TO-ELECTRIC FURNACE DUPLEXING!**

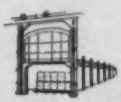
Precision control, continuous pouring and lower costs are but a few of the many advantages obtained with cupola-to-electric duplexing. And you'll get the best results with a Whiting Hydro-Arc Electric Furnace and a Whiting Cupola!

Dust Supressors

Cradle Furnaces



Annealing Ovens



Cupolas

## And look into these Whiting products too!

Pulverizers

Ladles

Tumblers

Cranes, Hoists and Trambeam Systems

MEMBER FEMA

*Write today for complete information!*

Get full data on all or any one of these Whiting products. Write:

**WHITING CORPORATION**

15628 Lathrop Ave., Harvey, Illinois

# At Monsanto's booth at the foundry show...

## see shell molds made on new, fast, automatic machine

One of the most profitable advantages of the Shell Molding Process is its adaptability to mechanization.

For example—fast new automatic machines that produce up to 40 shell molds per hour from one pattern are already in use, speeding production . . . cutting costs.

While you're at the foundry show, May 1-7, you'll want to see the latest developments in Shell Molding techniques and equipment—so be sure to visit the Monsanto exhibit, where you will see an actual demonstration of one of the newest of these mold-making machines.

• • • •

Also—for full information on Monsanto Resinox resins for shell molding and core binding, and for information on how Monsanto will help you test the Shell Molding Process in your own plant, just mail the handy coupon below. Resinox: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, Plastics Division,
Room 5609, Springfield 2, Mass.

☐ I would like to test the Shell Molding Process, please send me information on how Monsanto will help. ☐ Please send me information on Resinox resins for shell molding and core binding.

Name & Title _____

Company _____

Address _____

City, Zone, State _____

MONSANTO
CHEMICALS—PLASTICS
®

SERVING INDUSTRY . . . WHICH SERVES MANKIND

# SEE SCHNEIBLE MULTI-WASH

## ON DISPLAY AT

## THE INTERNATIONAL FOUNDRY EXHIBIT

## BOOTHS 1254 *and* 1353

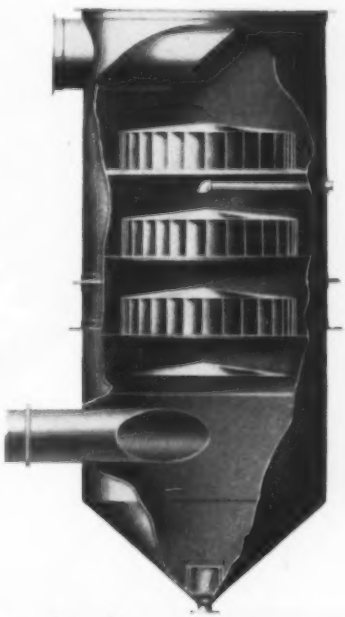
**LATEST ADVANCEMENTS IN DUST AND SMOKE CONTROL FOR ALL FOUNDRY OPERATIONS**

The Schneible Dust Collector display will be of interest to all foundry men. You'll see the principle of the Multi-Wash Collector demonstrated in actual operation through a transparent plastic shell and note the efficiency and the simplicity of construction.

You'll see a translite exhibit of the latest Schneible applications to many foundry operations.

You'll learn how the Schneible Multi-Wash System of Dust and Smoke control can clear up the atmosphere both inside and out for more production and better employee and civic cooperation.

Be sure to get the answers to your contamination control problems from Schneible at the show!



**CLAUDE B. SCHNEIBLE COMPANY**

P. O. Box 81 — North End Station — Detroit 2, Michigan

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

**SCHNEIBLE**

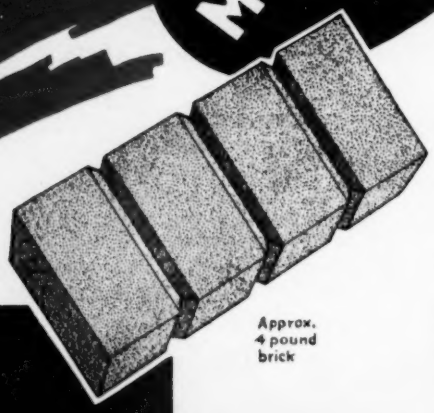
MANUFACTURERS • ENGINEERS • CONTRACTORS

**PRODUCTS:**

Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear Proof" Centrifugal Slurry Pumps

# Famous CORNELL CUPOLA FLUX

## MINIMIZES CASTING REJECTS



Approx. 4 pound brick

**SCRAP PILE before using Famous Cornell Cupola Flux.**

• • •

**A TYPICAL COMPARISON**

• • •

**SCRAP PILE during the use of Famous Cornell Cupola Flux.**

- **CLEANSES, DESULPHURIZES MOLTEN IRON**
- *Makes it more fluid*

**You take no chances when you use Famous Cornell Cupola Flux to condition molten metal for better castings. It is highly commended for its dependability by hundreds of leading gray iron foundries and malleable foundries with cupolas.**

**Famous Cornell Cupola Flux enables you to pour castings that are sounder, cleaner and with more even grain. Machinability, too, is greatly improved.**

**AND THERE IS GREATLY REDUCED DOWN TIME AND LABOR IN CUPOLA MAINTENANCE—because cupolas are kept cleaner, drops are cleaner, bridging over is practically eliminated, and there is less erosion of brick or stone due to a glazed or vitrified surface which is formed on cupola lining.**

***PRE-MEASURED SCORED BRICK FORM*** **takes practically no labor for handling. You just lift it out of container and toss it into cupola, and you can use the correct amount for each ton charge of iron or smaller charges—no waste. When charges are small, it takes a few seconds to break off and use one to three briquettes (quarter sections) as per instructions.**

***WRITE FOR BULLETIN NO. 46-B***

# BOOTH NO. 801-805

# Foundry Show

## Atlantic City, May 1-7

CLIFFORD B. CORNELL

● Our latch string is out at Suite No. 200-A, Hotel Dennis, for your entertainment after closing hours during the show.

SURELY, YOU WILL COME! There may be much profit from what you see and hear at this outstanding foundry convention and exhibition.

WE OFFER YOU A CORDIAL WELCOME, and suggest that you make our booth the meeting place for you and your friends.

Clifford B. Cornell
Secy.-Treas.

**The Cleveland Flux Co.**

**1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO**

*Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918*

FAMOUS CORNELL FLUXES
Trade Mark Registered

**BRASS FLUX**

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

**ALUMINUM FLUX**

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

# How to be Indispensable to an

**Castings come first.**

**Castings mean mining and oil-drilling machinery—freight cars and locomotives—looms and lathes—rolling mills and bottle machines; and so ad infinitum.**

**To an extraordinary degree castings come first—for no industry can manufacture its producing equipment without castings.**

**The Foundry Industry is indispensable to America's industrial economy.**

## "Better Castings, Cheaper, Under Better Conditions"

The function of Hydro-Blast is to be fundamentally useful to that Indispensable Industry—to enable foundries to make better castings, cheaper, under better working conditions.

## HYDRO-BLAST — Originator

Hydro-Blast originated the water-sand-blast method of cleaning castings. That method has had, will continue to have, wide use in foundries. In core knockout and surface cleaning, it produces cleaner castings, in a fraction of the time and at a fraction of the cost of older methods; and it is completely dustless.

Hydro-Blast originated a method of reclaiming refuse sand—a method that is commonly recovering 85 to 90 per cent of sand formerly dumped as refuse. Savings effected by many sand reclamation systems are repaying the entire cost in less than two years.

Hydro-Blast has evolved and proved a method of removing dust from air by means of high-velocity water jets. Results are extraordinary.

Continuous research in those three areas of usefulness is a basic element of Hydro-Blast service—research aimed at constant improvement of methods and of mechanisms to implement the methods.

## Each Installation a Custom Job

From the nature of the foundry business, it has never been practicable to build a "package" Hydro-Blast. Every installation since Hydro-Blast was established has been an individual and specific problem subject to special engineering study.

Thus Hydro-Blast usefulness is measured by the thoroughness of Hydro-Blast engineers in appraising the problem and the effectiveness of their solution for it. That they have done a consistently good job is indicated by the partial list of leading businesses that use Hydro-Blast.

Since 1934 the motivating purpose of Hydro-Blast has been unchanged: To be economically indispensable to an Indispensable Industry.

*At the Foundry Show*
*Booth 1217*

**HYDRO-**

2550 NORTH WESTERN AVE.

# INDISPENSABLE INDUSTRY

## PRODUCTS OF HYDRO-BLAST

**Wet Sand Reclamation Systems**

**Wet Blast Castings Cleaning Rooms**

**Wet Blast Castings Cleaning Cabinets**

**Wet Blast Castings Cleaning Barrels**

**Continuous Blast Cleaning Units**

**Wet Blast Deburring Equipment**

**Wet Blast Descaling Equipment**

**Dust Knockout Systems**

## A PARTIAL LIST OF HYDRO-BLAST USERS

Advance Foundry Co.
American Manganese Steel
American Steel Foundries
Black-Clawson
Bucyrus-Erie
Carnegie-Illinois Steel
Chicago Pneumatic Tool
Clark Bros.
Cooper-Bessemer
Crane
John Deere
Dominion Engineering (Montreal)
Erie Engine & Mfg. Co.
Erie Forge
Fahralloy, Ltd.
Fairbanks-Morse
Fiat (Italy)
Frick Company
General Electric
General Iron Works (Denver)
General Metals
General Motors
- Cadillac
- Central Foundry Division
- Fabricast

Gisholt Machine
Gould Pumps
Greenlee Bros.
Haynes Stellite
F. S. Lloyd, Ltd. (England)
Lynchburg Foundry Company
Massey Harris
National Bearings Metal (Brake Shoe)
National Malleable & Steel Castings
Ohio Steel Foundries
Renault (France)
Standard Steel Works
Toledo Machine & Tool
U. S. Naval Gun Factory
U. S. Navy Yard, Brooklyn
U. S. Navy Yard, Pearl Harbor
U. S. Navy Yard, Philadelphia
Westinghouse Electric
Worthington Pump.

**BLAST** CORPORATION

CHICAGO 47, ILLINOIS

**FOREIGN REPRESENTATIVES**

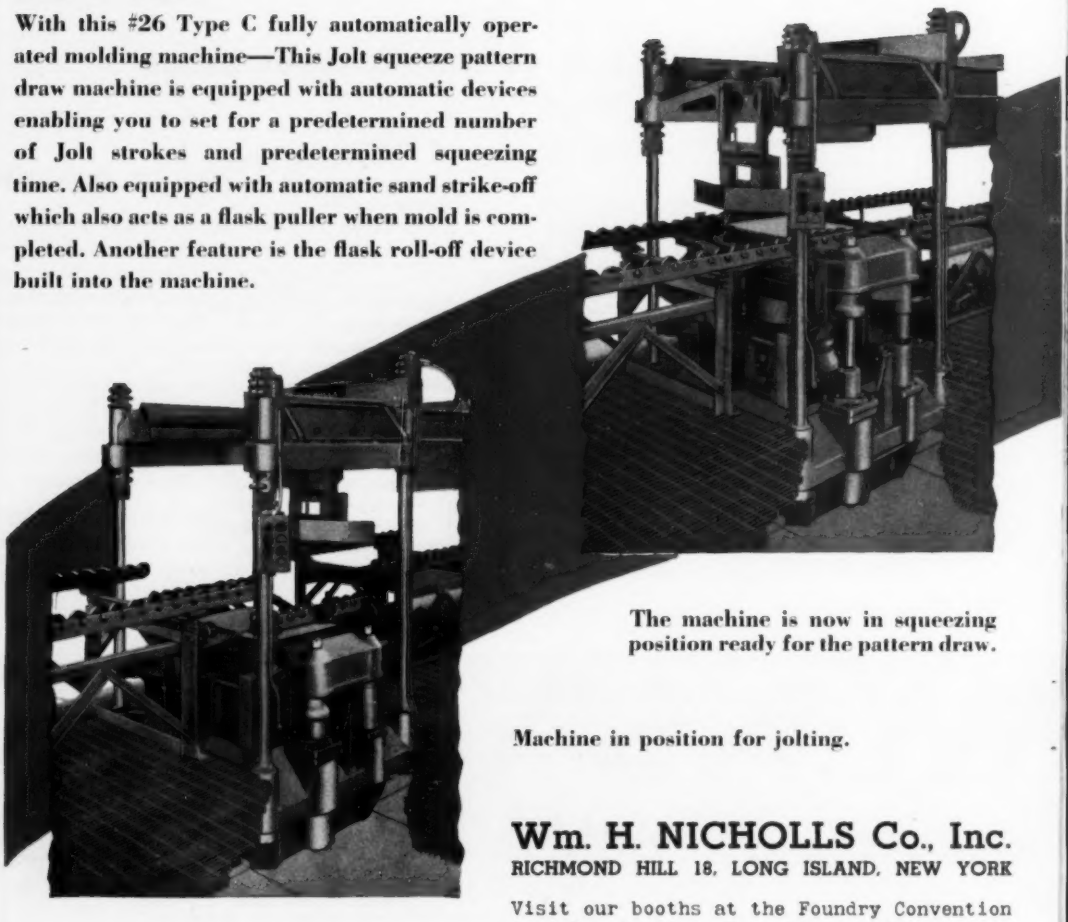
**England, Norway, Sweden, Denmark and Finland**—Pneulec Limited, Licensee, Smethwick (near Birmingham) England
**France, Belgium and Switzerland**—R. Dureuil, 78 Rue Anatole France, Levallois, Seine, France
**Germany**—Alfred Gutmann, Volckersstrasse 14-20, Hamburg-Altona 1, Germany
**Spain**—Talleres Auxiliares De Fundiciones S.L., Apartado 10, Zarauz (Guipuzcoa) Spain
**Italy**—Azeta, Viale Tunisia 41, Milano

NEW . . .
IMPROVED

# HEAVY DUTY
## JOLT—SQUEEZE—
## Equipped with "Safety" for fully automatic

### Increase production . . . Lower Costs

**With this #26 Type C fully automatically operated molding machine—This Jolt squeeze pattern draw machine is equipped with automatic devices enabling you to set for a predetermined number of Jolt strokes and predetermined squeezing time. Also equipped with automatic sand strike-off which also acts as a flask puller when mold is completed. Another feature is the flask roll-off device built into the machine.**



**The machine is now in squeezing position ready for the pattern draw.**

**Machine in position for jolting.**

**Wm. H. NICHOLLS Co., Inc.**
RICHMOND HILL 18, LONG ISLAND, NEW YORK

Visit our booths at the Foundry Convention in Atlantic City, Nos. 1843, 1845 and 1847

# MOLDING MACHINES
## *and PATTERN DRAW*
## Push-Button Controls
## operation

MAKES MOLDS
In SECONDS

### LOW UPKEEP

All draw pins and guide bushings are case hardened and ground to precision tolerances for perfect fit and smooth operation. An accurate system of gages and jigs provides interchangeability of parts for the same models.

The low upkeep records of hundreds of foundries attest for foresight of Nicholls' Engineers in designing inbuilt features that make for long life and accurate, dependable performance after years of service. As an instance, we point to the dirtproof housings and forced lubrication that are provided for all critical parts that might otherwise wear quickly and affect permanent alignment and satisfactory operation.

The international acceptance of large numbers of Nicholls' molding machines for many years is evidence of their productive capacity, combined with low upkeep and reliability.

*Write for Literature*

The pattern has been drawn, the pressure head returns to the out position and automatically pulls the finished mold onto the roller extension.

## GUARANTEED WORKMANSHIP

Smooth sensitive operation is built into all moving parts of Nicholls molding machines by expert mechanics, skilled in their specialized tasks. Close tolerances assured by a system of accurate jigs and fixtures.

# NICHOLLS

# WATCH

*for the* May AMERICAN FOUNDRYMAN

**OFFICIAL REVIEW OF THE AFS INTERNATIONAL FOUNDRY CONGRESS**

**AMERICAN FOUNDRYMAN is edited expressly for the purpose of rendering maximum service to the foundry industry. Small foundries as well as big plants regularly are considered when technical-practical material is selected and prepared for each issue.**

**By circulating the official record of the AFS International Foundry Congress to every major foundry center, AMERICAN FOUNDRYMAN will make it possible for this Important Industry Convention to be relived by the thousands of foundrymen who naturally will turn to AMERICAN FOUNDRYMAN for a comprehensive review of events that transpired in Atlantic City.**

**For those foundrymen who cannot attend this function in person, the May AMERICAN FOUNDRYMAN will be the link to the latest techniques and developments . . . to new equipment . . . to major business and social events that will influence the future of a leading mass production industry.**

*That's why all divisions of the foundry field will watch the . . . . . .*

**MAY AMERICAN FOUNDRYMAN**

ABC

**Official Publication of the American Foundrymen's Society 616 South Michigan Avenue Chicago 5, Illinois**

# *Foundrymen in the news*

C. F. Robinson

**Clinton F. Robinson,** director of The Carborundum Co., Niagara Falls, N. Y., has assumed the additional duty of president. He succeeds **H. K. Clark** in this capacity. Mr. Robinson's previous affiliations include president of Frederic B. Harris Co., New York; director and member of the executive committee of Fansteel Metallurgical Corp., Chicago; director and member of the executive committee of R. P. Bennett Co., Frederick, Md.; and director of American Metallic Corp., Portland, Ore. He has also been active in government work.

**Raymond S. Wood** will succeed **C. V. Loughery** as general manager of Link-Belt Company's ball and roller bearing plant in Indianapolis, known as the Dodge Plant.

**John F. Schnur,** foundry superintendent for the McLean Iron Works, Palatka, Fla., has been named foundry technologist at Armour Research Foundation of Illinois Institute of Technology, Chicago. Mr. Schnur will be assigned to a project in India, where he will study foundry practices and make recommendations for modern techniques.

**George C. Floyd,** vice-president of Vanadium Corp. of America, New York, is now a director of the company. **Patrick J. Gibbons** has retired as executive vice-president of Vanadium Corp., but will serve in an advisory capacity.

**William A. FitzGerald** has been named assistant sales manager of the Ajax Metal Div. of H. Kramer & Co., Phila.

**William S. Robinson,** until recently president of Consolidated zinc Corp., Ltd., London, was awarded the Institute of Metals Medal for developing the Australian zinc-lead industry and the British zinc industry. The Institute of Metals, London, also awarded medals to **Andre Guinier,** Conservatoire National des Arts et Metiers, Paris, and to **Cyril E. Davies.**

**Leighton M. Long** has disposed of his interests in Bushings, Inc., Philadelphia, to devote his time to consulting work. He was for a number of years chief metallurgist and foundry superintendent of Bunting Brass & Bronze Co., Toledo.

**George L. Ratcliffe** has been elected a vice-president of National Lead Co. He has been a director since 1948 and general manager of the Baroid Sales Div. since 1929, when he joined the company.

**J. P. Little** will serve as sales manager of Bridgeport Brass Co., Exeter Brass Div., Exeter, N. H. He will be responsible for sales of all products made at Exeter.

**Robert W. Ellms** has been promoted to assistant chief engineer while **Ted Hatch** has been elevated to supervisor, Research & Development Dept., Machine Div., Osborn Mfg. Co., Cleveland. Both men were previously engineers in the division.

R. W. Ellms

Ted Hatch

**Joseph H. Cannon,** process engineer and formerly in plant layout and in core room supervision, Aircraft Engine Div., Ford Motor Co., Chicago, left the company the end of January to serve as a foundry consultant with the Mutual Security Agency. His headquarters will be in Paris, France.

**Lt. Harry R. Dahlberg,** USNR, is assistant naval inspector of ordnance at E. W. Bliss Co., Canton, Ohio. He was with Twin City Testing & Engineering Laboratory, St. Paul, Minn., until leaving in 1951 to work in the Industrial Survey Section, Management Control Branch, Bureau of Ordnance, Washington, D. C.

**John K. Beidler** was appointed general manager of Dravo Corp., Machinery Div., Pittsburgh. He was also elected a director and a vice-president of Dravo-Doyle Co., a subsidiary of Dravo.

**O. D. Rice,** formerly chief engineer for Rust Furnace Co., Pittsburgh, has been appointed manager of operations. **H. Hayward Dinneen** succeeds him as chief engineer. Other promotions include **Leonard G. Meier** to chief draftsman, and **Richard W. Ewalt** to assistant manager of sales.

**Carl W. Tuohey** is the new representative for Frank G. Hough Co., Libertyville, Ill. He will handle New York, New Jersey, Pennsylvania, Virginia, Delaware, West Virginia, and New England. He replaces **William Cornell,** who was drafted.

**Harry C. Swanson,** vice-president and general manager, Arrow Pattern & Foundry Co., Inc., Chicago, who recently was elected to the vice-presidency of the Chicago Foundrymen's Association, assumed the duties of the executive head of the association at the direction of the board. **Robert F. Groves,** president and general manager of Love Bros., Inc., Aurora, Ill., was elected to the board. **Mildred Kosar** continues with the association as executive secretary.

**William E. Mahin,** director of research at Armour Research Foundation of Illinois Institute of Technology, Chicago, has been named to the subcommittee on aircraft structural materials of the NACA. He also is consultant to the

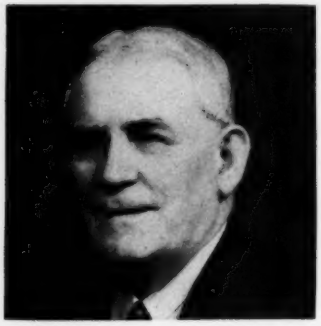
Minerals & Metals Advisory Board of the National Research Council, and recently was elected chairman of the Chicago section of AIMME.

**Walter J. Dahl** has been appointed to the sales engineering staff of Baker Industrial Truck Co. of Illiana, Chicago area distributor for Baker-Raulang Co., Cleveland.

**Arthur J. Buckley** has been appointed assistant sales manager for Pangborn Corp., Hagerstown, Md.

**C. V. Migula** has joined Hewitt-Robins Inc., New York, as manager of the western sales division. Headquarters are in San Francisco. He replaces **J. H. Hayden,** who is retiring but will continue to serve in an advisory capacity. For several years Migula & Co. has acted as west coast agents for Hewitt-Robins in the engineering and sales of its products. Hewitt-Robins will now take over the assets of Migula & Co. as well as some of its personnel. **Marion D. Austin,** with Hewitt-Robins since 1947, will join Migula as district manager of the Hewitt Rubber Div. **K. L. Way** moves into Austin's previous position as manager of hose sales and development.

**John C. Tirrell,** general foundry foreman of Warren Foundry & Pipe Corp., Phil-



J. C. Tirrell

lipsburg, N. J., retired at the end of February. Mr. Tirrell had been with this company for 60 years and 5 months —all his occupational life.

**P. E. Holder** is the new assistant district manager of the St. Louis district for Industrial Chemicals Div., American Cyanamid Co., New York. He was formerly sales representative in the company's Detroit area.

**Edward J. Metzger,** formerly chief metals consultant, Foundry Div., OPS, resigned at the end of the year to become owner and operator of Multicast Corp., Wauseon, Ohio.

**S. L. Johnson** became manager of the New Methods Development Div., of Minnesota Mining & Mfg. Co., St. Paul, Minnesota, last month. His division is developing machinery and techniques for conditioning carbon and alloy steels, and improving methods for grinding and finishing other metals.

**T. F. Fleming** is the new general manager of Morrison Engineering Corp., Cleveland. He will head the metallurgical department. Formerly, Mr. Fleming was supervisor of the heat treating department of National Screw & Mfg. Co., Cleveland. In 1936-38 he was associated with Morrison Engineering.

**Gordon R. Ball** was recently elected director of International Nickel Co., Inc., New York. Mr. Ball is vice-president, general manager, and a director of the Bank of Montreal.

**Kenneth C. Towe** was elected president of American Cyanamid Co., New York, at a meeting of the board of directors January 22. He has been a director of the company since 1939, and is director of several companies associated with American Cyanamid.

**James A. Rankin,** Worthington Pump & Machinery Corp., Buffalo, received the Foundrymen's Award at the class day exercises of Buffalo State Technical Institute as the outstanding student in

A. A. Diebold - J. A. Rankin

metallurgy for foundry work. Presentation was made by **Alfred A. Diebold,** works manager of the Atlas Steel Casting Co., Buffalo, and past chairman of the Western New York Chapter of A.F.S.

**Emery N. Mumma** is opening a branch office of Baker Industrial Truck Div. of Baker-Raulang Co., Cleveland, in Baltimore, Md., with **Edward G. Matthew** as manager.

**John Lund** has been appointed district manager of Air Reduction Magnolia Co., a division of Air Reduction Co. Inc., New York. His headquarters will be in Shreveport, La. He assumes the duties of the late **H. T. Wadley.**

A. Rasmussen

**A. Rasmussen** and **Robert E. Kroc** have been advanced by Fahralloy Co., Harvey, Ill. Rasmussen becomes vice-president, and Kroc becomes sales manager.

**George F. Walsh** has been appointed sales promotion manager by Gould-National Batteries, Inc., Trenton, N. J. For the past four years he has held a similar position with Baldwin-Lima-Hamilton Corp. at Eddystone, Pa.

**George P. Long** has joined the Cleveland Chain & Mfg. Co. as assistant general sales manager, it is announced by **James W. Dickey,** vice-president and general manager. Mr. Long attended the University of Pittsburgh, where he majored in business subjects.

**Leonard W. Bughman, John J. Dowdle, III, Bartley J. Fleming,** and **Willis P. Tuller** have been elected vice-presidents of Great Lakes Carbon Corp., it was announced by **George Skakel,** president. Mr. Bughman will be located in Pittsburgh, Mr. Tuller in Chicago. Mr. Dowdle and Mr. Fleming will both be located in New York.

**D. F. McMahon,** formerly president of Quigley Co., Inc., New York, was recently elected chairman of the board. At the same time, **J. A. Mulcahy,** treasurer, was elected president; he will also continue as treasurer. **G. B. Quigley** was elected secretary. **R. J. Demaison** was elected vice-president in addition to technical director. **S. F. Murphy** will continue as 1st vice-president in charge of sales, and **H. T. Thayer** will continue as vice-president and chief engineer.

**F. J. MacDougall,** office supervisor in Allis-Chalmers Mfg. Co.'s purchasing division since 1945, has been named assistant to the director of purchases **K. R. Geist. Ray E. Lewin,** formerly assistant purchasing agent, replaces MacDougall as office supervisor.

**Robert A. O'Brien,** research manager for ASME, has been appointed assistant to the chairman of the mechanism and propulsion research department at Ar-

*continued on page 206*

# Core Baking Time Halved

## WITH TRULINE BINDER IN THE MIX

Huge cores such as this, with thick cross sections, require two nights for baking when core oil is used in the mix. Even then, bottoms are sometimes green. By replacing oil with Truline Binder, cores bake faster and uniformly. The one shown here was thoroughly baked overnight!

Truline-bonded cores do a better and faster job all the way. They bake faster . . . increase productive capacity of ovens. They mean less gas at pouring time, thus sounder castings. They collapse easily, and shake out fast. Truline saves up to 50% in cleaning time, and castings come out cleaner . . . require less finishing.

If you are trying to meet accelerated production demands, especially with existing equipment and manpower, it will pay you to send for technical data on Truline Binder. Our foundry service men will be happy to work with you.

NF52-1

HERCULES POWDER COMPANY Naval Stores Dept., 912 Market St., Wilmington, Del.

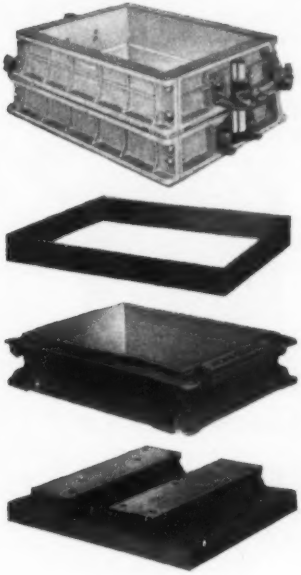
SEE WHAT They SAY
ABOUT
SHELL MOLDING
at
Giffels & Vallet
GIFFELS & VALLET, INC.
INDUSTRIAL ENGINEERING DIVISION
1000 Marquette Bldg. • Detroit 26, Michigan
COMPLETE FOUNDRY ENGINEERING SERVICE
Our foundry engineers are available to assist you. We will gladly, without obligation, discuss your engineering problems and the assistance we can render.

# *Boost Foundry Efficiency*

*with*

## ADAMS MOLDING MACHINES
## ADAMS FLASK EQUIPMENT

Adams 12"-38"
Jolt Squeezer
Portable Type



SIXTY-NINE YEARS of supplying foundries has given Adams experience and skill in designing machines and equipment that help boost efficiency in your foundry. Call on Adams for quality Flask Equipment, custom-built to your specifications. The complete line includes practically every type of flask, jacket, upset, presser board, bottom plate and band. Adams time and money saving Molding Machines are available in pneumatically operated post and side rod types, in portable and stationary models, also hand operated models.

All Adams equipment is built by master craftsmen with the finest materials available, and the most up-to-date manufacturing facilities and methods. Write today for descriptive literature.

Manufactured by

# The Adams Company

**Dubuque, Iowa, U. S. A.**

1883 — SIXTY-NINE YEARS OF SERVICE — 1952

# for much higher efficiency . . . at much lower costs . . .

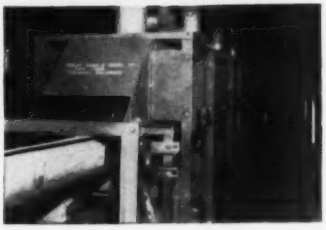
## first check PEKAY

**PEKAY**

***POWER FLOW*** for perfect control and distribution of material flow at all times . . . *never* any starved hoppers . . . smaller bins make work on molds easier, cut down on mess and dirt, practically eliminate caking and packing . . . a cleaner, easier, maintenance-reducing and labor-saving operation, proved out in continuous heavy-duty use. Let PEKAY engineers show you specific ways in which *your* operation can profit.

**PEKAY**

***Mixer-Muller*** in actual use, has done this: stepped up Green Compression Strength from 10.5 to 12 lbs. . . . boosted Permeability from 100 to 110 . . . cut Bonding Material use in half . . . maintained correct Moisture Content . . . and delivered this *better* sand at an increase of volume per hour of 85%! Easy to install, too . . . normally takes only 100 man-hours, placed anywhere along your belt system without major reconstruction. Inspection is simple . . . maintenance costs practically vanish.



**PEKAY**

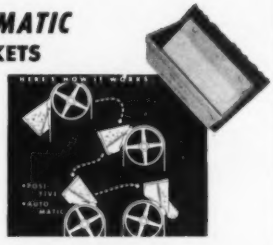
**AIRATOR** for exceptionally long life, and much less frequent replacement of wearing parts . . . thoroughly aerates, cuts and fluffs sand — lets you say good-bye to lump trouble for good . . . a compact but ruggedly built piece of equipment . . . only 25 man-hours required to install with your present belt system . . . easy inspection through side-plate for all moving parts. A low-cost way to consistently better production.

**Limitator**

INDICATOR-CONTROL *for* GRANULAR & CRUSHED MATERIALS

gives *positive, adjustable control* of sand (and any other granular or crushed materials)—with *no holes to cut* in your bin or hopper! Accurately indicates the level to be maintained in bin . . . quickly adjustable to any desired level by outside Selector Screw . . . practical, sturdy, trouble-free construction . . . no electrical parts in bin or material . . . easily adapted to activate warning bells, buzzers, lights, feed gates.

**PEKAY *M-T-MATIC* ELEVATOR BUCKETS**



speed operations, cut costs by "can't fail" complete emptying on *every* trip. Thousands in successful use . . . standard sizes to fit your conveyor.

★ *SEE THIS EQUIPMENT AT OUR ATLANTIC CITY DISPLAY—WE WILL ALSO SHOW THE REVOLUTIONARY NEW "TROFF-O-MATIC" TROUGHING CONVEYOR!*

**VISIT US AT** **BOOTHS 203-5-7**

**PEKAY MACHINE & ENGINEERING CO.**

100 N. LA SALLE STREET CHICAGO 2, ILLINOIS

FOR SURE RESULTS IN MAKING A CASTING, USE

# PENOLYN CORE OIL

Fo… …pecify
Pe… …Type
of … …every
co…

Per… …ncy—
- U…
- C…
- N…
- N…
- N…

Penola

*We welcome you to the Penola Booth*
*American Foundryman's Society*
*International Congress & Show*
*May 1st to 7th. Atlantic City, N.J.*

PENOLA OIL COMPANY

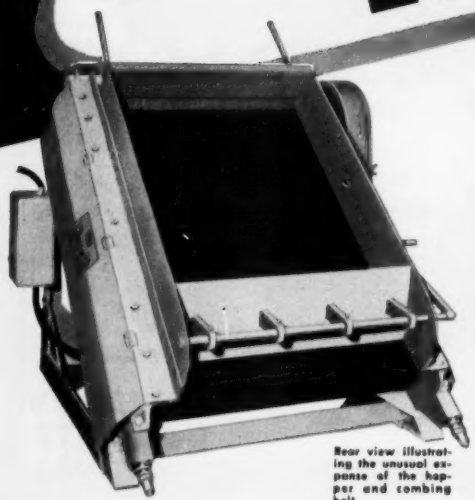
NEW YORK • DETROIT • CHICAGO • ST. LOUIS

Penola

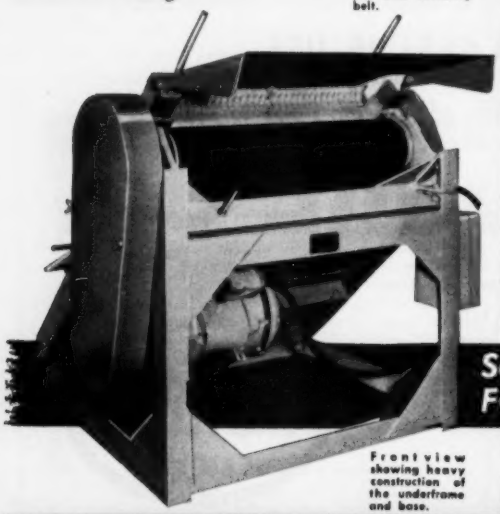
**FOR EXPERT TECHNICAL ASSISTANCE** — be sure to call the nearest Penola Office for any technical data or assistance you may need regarding your casting operations.

# NEW STURDY EFFICIENT

## The Model "NYS" ROYER SAND CONDITIONER



Rear view illustrating the unusual expanse of the hopper and combing belt.



Front view showing heavy construction of the underframe and base.

This new Model "NYS" Royer Sand Separator and Blender is designed primarily for supplying large mullers and for use in sand handling systems having a conditioned sand requirement of 60 tons per hour or more. Its rated capacity is from 60 to 100 tons, depending upon the type and temper of the sand.

The "NYS", like all Royer models, gives complete sand preparation . . . refuse removal, blending, even moisture distribution, lump breaking, increased permeability and double aeration. Its sturdy construction . . . heavy welded underframe and base . . . assures foundrymen of many years of service under the most abusive operating conditions.

Write for details on this labor saving, production increasing machine.

### SPECIFICATIONS

Capacity: 60 to 100 tons per hour depending on type and temper of sand.

Overall Dimensions: Length—54"
Width—56"
Height—54"
Weight—Approx. 2000 lbs.

Power: 10 or 15 HP depending on requirements of installation.

Construction: Heavy welded angle frame and base.

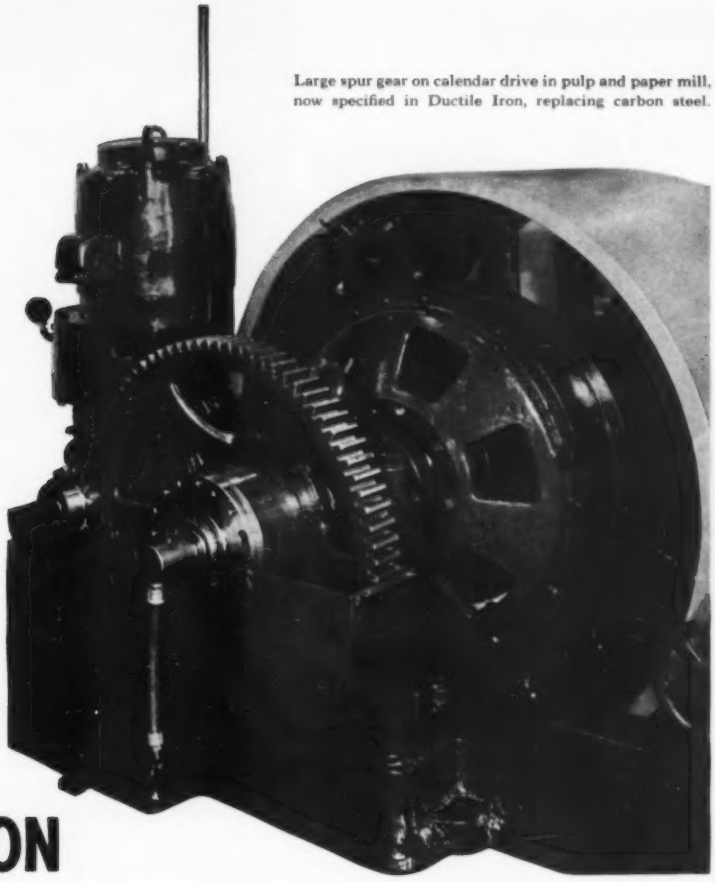
*See the "NYS" featured at the FOUNDRY SHOW next MAY*

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

**ROYER FOUNDRY & MACHINE CO.**

155 PRINGLE ST., KINGSTON, PA.



Large spur gear on calendar drive in pulp and paper mill, now specified in Ductile Iron, replacing carbon steel.

# DUCTILE IRON

## *Proves Its Stamina in Machinery Gears*

Black-Clawson Company of Hamilton, Ohio, reports several advantages obtained in their production of paper mill and allied equipment by replacing alloy gear castings and forgings with parts made from Ductile Iron.

The gear, illustrated, is typical of these Ductile Iron castings.

Not only has Black-Clawson saved critical materials by using Ductile Iron, but the ease of fabricating contributes to the maintenance of production schedules.

Black-Clawson foundries now produce Ductile Iron in five basic grades for castings that range from less than a pound to more than 7½ tons in weight. Tensile strengths up to 216,000 p.s.i., and hardness that exceeds 400 BHN, may be attained by heat treating Ductile Iron. This company also successfully welds Ductile Iron to steel, to stainless steel, and to itself.

Ductile Iron applications include as-cast and heat treated components for industrial, automotive and agricultural equipment. Also, for railway and other heavy industrial equipment, as well as that used in textile, electrical, marine and other fields too numerous to list.

* * *

**YOUR OPPORTUNITY:** Join the increasing number of successful foundries now producing Ductile Iron. Write for additional information on the production advantages and types of castings for which Ductile Iron has been adopted.

INCO

**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET NEW YORK 5, N.Y.

operating costs

# Cut ½

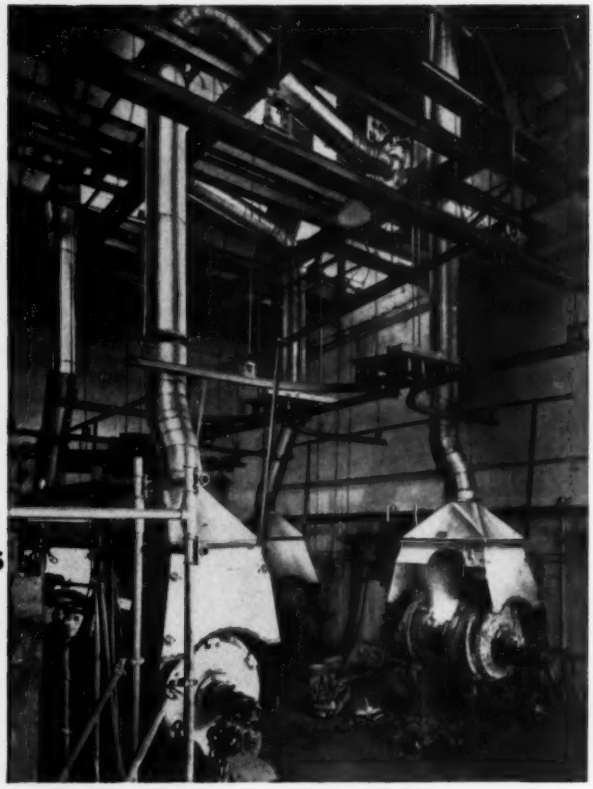
... FUME CONTROL SYSTEMS

by KIRK AND BLUM

**At The William Powell Company**
**Cincinnati Valve Manufacturers**

•

Twelve electric furnaces in the non-ferrous foundry of this noted valve manufacturer are individually exhausted by just six fans. Fan-driven exhaust from one hood is injected into a venturi in the piping from another hood.



In metals melting operations, uncontrolled smoke, fumes and gases are a toxic nuisance. At The William Powell Company, "Clean Air . . . the Invisible Tool," as applied by KIRK & BLUM Engineers, controls this condition.

In addition, KIRK & BLUM Engineers, by utilizing the injector principle reduced initial cost, operating costs and halved maintenance—since each fan provides individual exhaust for two furnaces.

Although a "home-grown" system may be low in first cost, its savings fade when compared to the efficiency, lower maintenance and operating costs of a correctly designed, fabricated and installed system. Put your dust or fume problems up to experts . . . The Kirk & Blum Mfg. Company.

System OFF

...and System ON

**THE KIRK & BLUM MFG. CO.**
3176 Forrer Street Cincinnati 9, Ohio

FUME CONTROL SYSTEMS

*Now!*

# TOCCO* Induction Melting Furnaces for Precision Casting

One of the TOCCO Induction Melting Furnaces used at Arwood Precision Casting Co. Note TOCCO control station in background.

● Engineers at Arwood Precision Casting Co. use TOCCO Induction Melting Furnaces for melting and remelting quality steel. Other companies have found TOCCO equally adaptable for melting non-ferrous metals. No wonder! *Look at the advantages:*

- ★ Stepless power control
- ★ Extremely Rapid Melting
- ★ High Efficiency on Intermittent Operation
- ★ Good Mixing because of Natural Agitation
- ★ Extremely Low Alloy Loss
- ★ No Carbon Pick-up
- ★ No Contamination when Composition of Charges is Changed
- ★ High Reproducibility of Results
- ★ Minimum Space Requirements
- ★ No Special Installation Charge
- ★ Simple, Safe Operation
- ★ Clean, Comfortable Working Conditions

If any of these advantages suggest economies in your operations write for full details—no obligation, of course.

**THE OHIO CRANKSHAFT COMPANY**

**TOCCO**

*Mail Coupon Today*

NEW **FREE** BULLETIN

**THE OHIO CRANKSHAFT CO.**
**Dept. N-4, Cleveland 1, Ohio**

Please send copy of "The Case for TOCCO Induction Melting."

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

# DELTA FOR *Faster* OF FINER-

## A COMPLETE LINE OF *Scientifically* CONTROLLED FOUNDRY PRODUCTS

DELTA products for the foundry are PRODUCTS OF RESEARCH. For nearly twenty years many important scientific developments . . . valuable contributions to the advancement of foundry practices . . . have originated in DELTA'S laboratories where the most modern scientific facilities are employed in a continuing program of product research, development and standardization.

Every DELTA Foundry Product is first tested by laboratory methods then submitted for use and final approval in ACTUAL FOUNDRY PRACTICE before it is identified with the name "DELTA".

There is no "just as good" substitute for ANY Delta Foundry Product just as there is no substitute for DELTA'S scientific controls which safeguard the quality and uniformity of all DELTA Foundry Products.

Among the many *"FIRSTS"* introduced by DELTA laboratories are Plastic-type Core and Mold Washes and, more recently, a Sand Release Agent (96°B) embodying unique and distinctive characteristics.

**DELTA CONTINUES TO LEAD IN THE DEVELOPMENT OF NEW PRODUCTS FOR IMPROVED FOUNDRY PRACTICE.**

**VISIT US AT OUR BOOTH — NUMBER 1443**
**56th ANNUAL A.F.S. FOUNDRY CONGRESS & SHOW**
**Atlantic City, New Jersey**
**May 1 - 7, 1952**

# Production FINISH CASTINGS

**CORE AND MOLD WASHES:**

**FOR STEEL:**
**Delta Special Core and Mold Wash Base** — Used by more steel foundries than all other types of washes combined.
**Delta SteelKoat** — a finished high fusion waterproof wash.

**FOR ALL TYPES OF SAND CAST METALS:**
**Delta ThermoKoat** — It's plasti-lastic, non-heat shocking, highest fusion and hot strength.
**Delta Z-Koat** — a zirconium wash with unusual properties in contact with molten metal.

**FOR GRAY IRON, MALLEABLE, BRONZE AND BRASS:**
**Delta GraKoat** — no reaction with molten metal.
**Delta BlacKoat** — a black wash, free from carbon, no gas in contact with molten metal.

**FOR GRAY IRON:**
**Delta BlacKoat S-5** — a new and different wash. Produces results, on gray iron castings, unequalled by any other wash.

**FOR NON-FERROUS AND LIGHT METALS:**
**Delta NonferrusKoat** — produces unusually smooth surface castings.

**PARTING COMPOUNDS:**
**Delta Partex** — (Nutshell partings) has lycopodium properties, non-injurious and non-hazardous to use.
**Delta Liquid Parting**—Low-cost, highly effective and lasting.

**MUDDING & PATCHING COMPOUNDS:**
**Delta Silktite** — a light colored mud for all types of metal castings.
**Delta Ebony** — a black mud for gray iron, malleable and nonferrous work.
All mudding compounds seal core joints and hold joints together at high temperatures.

**NO-VEIN COMPOUND:**
A special compound, not iron oxide. A high hot strength and sand plasticizing material. Stops veins and penetration.

**MOLD SURFACE BINDERS — LIQUID:**
**Delta Spray Binders** — Produce dry sand mold results by surface spraying of green sand molds.

**PERMI-BOND:**
Eliminates Sea Coal Nuisance: The new modern scientific sea coal replacement.

**DRI-BOND:**
A new type of Dry Binder which provides new economies. Fast-baking, reduces veining and penetration. Can be used with old sand equally as well as with new sand.

**BONDITE:**
Produces a reducing mold atmosphere: Delta Bondite, a dry binder which becomes waterproof on drying and produces mold atmosphere which is high in reducing gas.

**96-B SAND RELEASE AGENT:**
Another Foundry "First" by Delta. By adding 8 oz. or less per ton to your core or molding sand mixes, your sands will flow freely. 96-B is completely volatile at elevated temperatures and does not contaminate the sand.

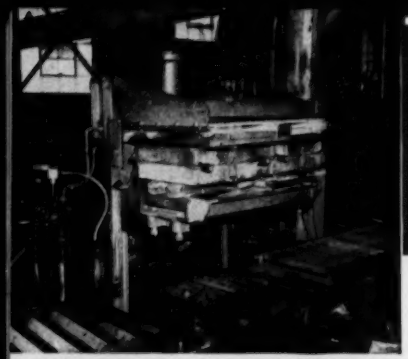
**CORE ROD DIP OIL NO. 224X:**
Ties core rods and wires into the cores: Rods and wires coated with Delta Core Rod Dip Oil adhere to the sand. Eliminates need for 50% of the rods and wires and reduces core breakage.

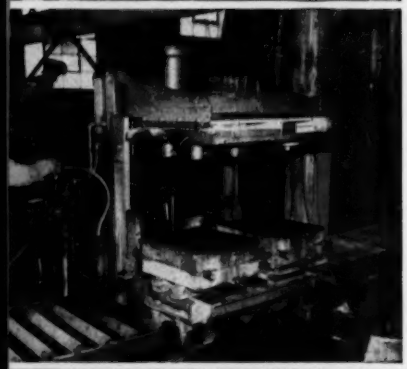
**DELTA SAND CONDITIONING OIL:**
Sticking core sand mixes work freely in core boxes when sand conditioning oil is added to core sand mixes.

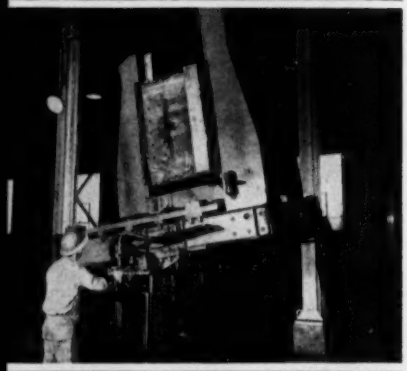
**CORE OILS:**
High tensile, low gas, faster baking, exceptionally economical to use.

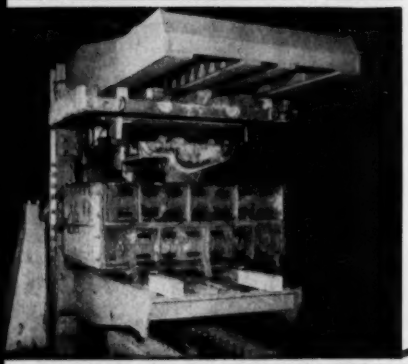
***Get the Fac***
Delta Technical Men will be at [illegible] booth to answer your questions and discuss with you problems relative to foundry practice. Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

# DELTA OIL PRODUCTS CO.
MILWAUKEE 9, WISCONSIN









# Don't Miss S
# INTERNATION

## AT TI
## FOUNDRY CON

*"There is an* **INTERNATIONAL** *for Every Job"*

Internationals are designed and built by experienced Foundry Engineers, who have a practical knowledge of the problems of the foundry business.

**INTERNATIONAL MOLDING M**

**LA GRANGE PARK, ILLI**

# Seeing The Great

# AL TYPE AN MACHINE

## HE INTERNATIONAL

## GRESS AND SHOW • ATLANTIC CITY MAY 1-7, 1952

### *The Big Features and Advantages of The International* **TYPE AN** *Machine*

- **Ideal for Short runs**
- **Designed for job work or for production work in any foundry**
- **Flexible—for either cores or molds**
- **Manufactured in sizes to cover your foundry needs**
- **Turnover Capacity—1500 lbs. to 14,000 lbs.**

**INTERNATIONAL TYPE JJR DOUBLE JOLT MACHINES**

Perfect Companions to the Type AN Machine. Rollers are an integral part of the machine for roll-off or roll-on — Jolt capacities 1500 to 12,000 lbs.

**INTERNATIONAL'S SPACE 1339**

## ACHINE COMPANY

NOIS

What's the lining life of your
high frequency induction furnaces
melting nickel-chrome steel alloys?

## Get more heats with rammed linings of

# Taylor Zircon

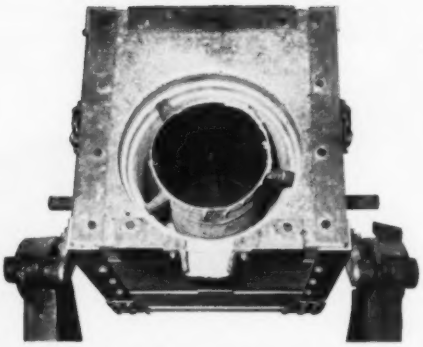
Many foundries have standardized on Taylor Zircon No. 717 grog-type Ramming Mix for lining Ajax-Northrup, Allis-Chalmers and other types of high-frequency furnaces melting nickel, stainless steel and similar high nickel-chrome alloys. High softening point, low thermal conductivity, high di-electric strength, freedom from shrinkage make Taylor Zircon an excellent refractory for this service.

**FACTS . . .**

- Average life of linings made of Taylor Zircon No. 717* Ramming Mix is 20 to 30% longer than that of linings rammed of magnesia, magnesia-alumina spinel and/or sillimanite or mullite when melting high nickel alloys.
- A foundry operating four 650 lb. Allis-Chalmers high frequency furnaces obtained 117 heats on a No. 717 rammed lining melting pure nickel and nickel-bronze alloys.
- A foundry melting 97.5% nickel in 650 lb. Ajax-Northrup obtained 80 heats on Taylor Zircon before patching was required.

A complete line of TASIL (converted mullite), TAMUL (synthetic mullite) and TAYCOR (corundum base) Ramming Mixes and Patches are also offered for varying service conditions. Detailed information contained in Bulletin 315—just off the press. Write for your copy.

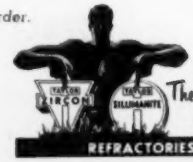
** Shipped either WET or DRY—specify on your order.*



Installing Taylor Zircon No. 717 (Wet) Ramming Mix in 300 lb. Ajax-Northrup induction furnace. Before ramming the lining, Taylor Sillimanite (TASIL) No. 101 Patch is used for sealing the primary coil. After drying, Taylor Zircon is rammed in place and No. 101 Patch is used to seal the top and for forming the pouring spout.

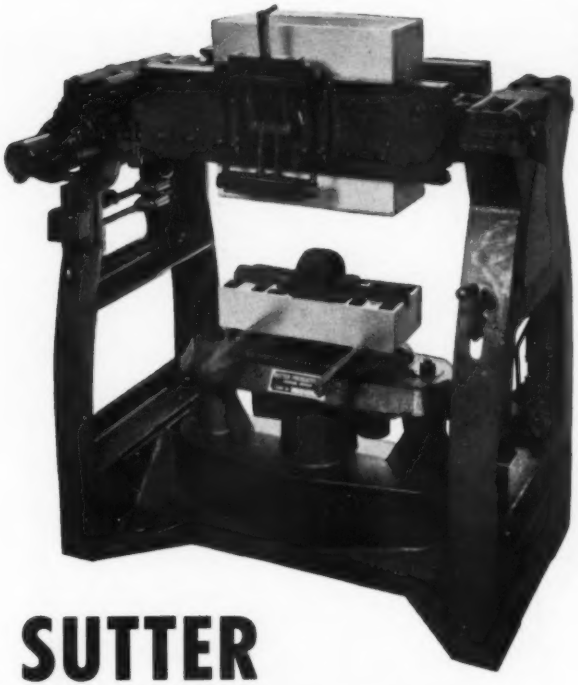
Photo at top of page shows the interior of a 1000 lb. Allis-Chalmers furnace lined with Taylor Zircon at end of pour.

**Exclusive Agents in Canada:**
**REFRACTORIES ENGINEERING AND SUPPLIES, LTD.**
**Hamilton and Montreal**




**The CHAS. TAYLOR SONS Co.**
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U.S.A.

# See how you can boost core output 300%



## visit BOOTH 1350
## FOUNDRY SHOW
## Atlantic City

# SUTTER

**AUTOMATIC CORE DRAW MACHINE WITH POWER ROLLOVER**

After clamping the dryer, push the start button and six seconds later a drawn core rests on the draw table . . . it's that simple with the Sutter Core Draw Machine. This rapid, completely automatic cycle speeds up production 300% to 400% and also frees the operator to blow another core while one is being drawn. Further, because every core is drawn uniformly, even unskilled operators can maintain peak production of the most complicated cores with minimum rejects.

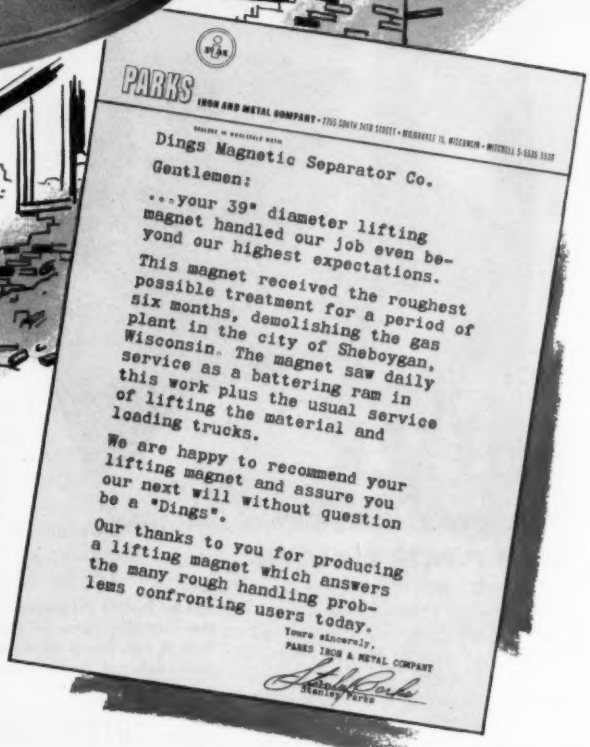
The Sutter Automatic Core Draw Machine will be operating at the Foundry Show in Booth 1350. Be sure to look in and find out how it can boost production and cut core costs in *your* plant. If you can't get to the show, send for Bulletin "F" which gives the whole story.

***See* SUTTER SHELL MOLDING MACHINE *in operation at* BOOTH 1839**

**SUTTER PRODUCTS COMPANY**

2005 WESTWOOD AVENUE • DEARBORN, MICH.

# Shock Test proves Dings new Lifting Magnet CAN TAKE IT!



PARKS IRON AND METAL COMPANY • 7765 SOUTH 76TH STREET • MILWAUKEE 13, WISCONSIN • MITCHELL 5-6626 3330

Dings Magnetic Separator Co.

Gentlemen:

...your 39" diameter lifting magnet handled our job even beyond our highest expectations.

This magnet received the roughest possible treatment for a period of six months, demolishing the gas plant in the city of Sheboygan, Wisconsin. The magnet saw daily service as a battering ram in this work plus the usual service of lifting the material and loading trucks.

We are happy to recommend your lifting magnet and assure you our next will without question be a "Dings".

Our thanks to you for producing a lifting magnet which answers the many rough handling problems confronting users today.

Yours sincerely,
PARKS IRON & METAL COMPANY
Stanley Parks

"ROUGHEST possible treatment for 6 months," says Parks Iron & Metal (right).... Users have been impressed with the way the Dings all-welded lifting magnet hoists a full load *all* day right up to quitting time. THAT'S BECAUSE it's cooler operating. NOW some really rugged assignments like the one at right have proven this magnet is thick skinned as well as muscled. Yet it's light. THAT'S BECAUSE the magnet is heavily reinforced *where it counts.*

Here, then, is a testimonial that any handler of metals can translate into his own profit story. Let your nearest Dings Representative give you details. Or write for the new lifting magnet bulletin —today,

**DINGS MAGNETIC SEPARATOR CO.**
4714 W. Electric Ave., Milwaukee 46, Wisconsin

***Deliveries Are Still Good!***

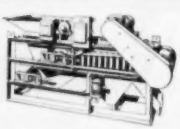
Associate Member,
Institute of Scrap Iron & Steel Inc.

## DINGS MAGNETS

**SCRAP SEPARATORS:**

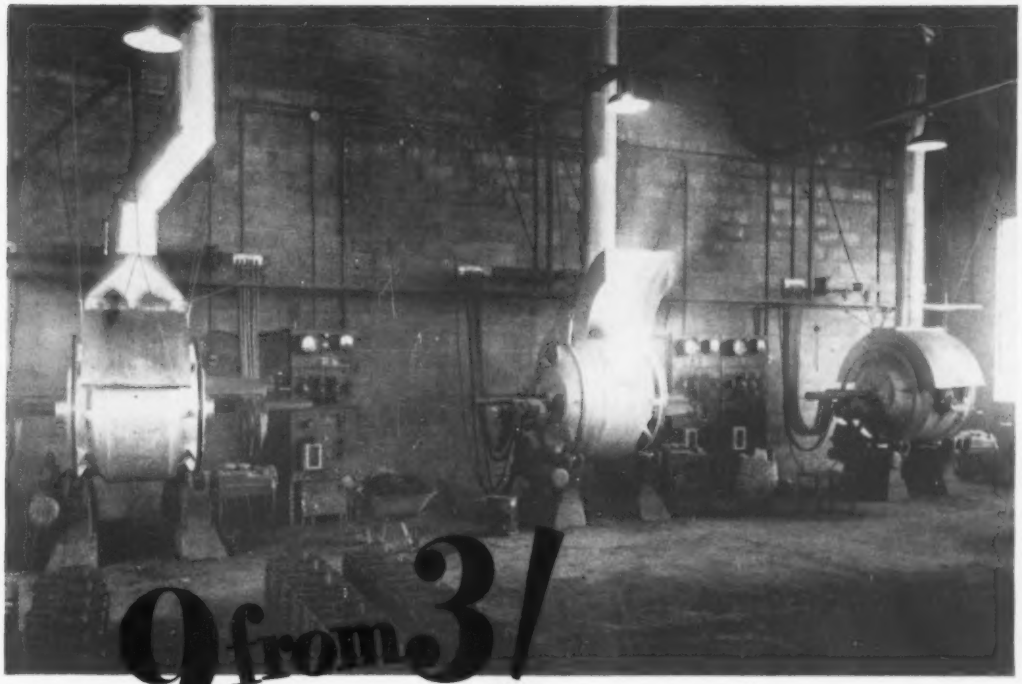
Electric and Non-Electric Pulleys

Non-Electric Drums



Type BN

Type MA



# 9 from 3!

## NINE TONS OF HIGH QUALITY IRON PER SHIFT FROM THESE 3 DETROIT ROCKING ELECTRIC FURNACES

Vassar Electroloy Products Company has based its growth on precisely controlled, quality iron and steel castings. In five years, metal melting requirements have increased more than 700%.

Today, three 700-lb. Detroit Rocking Electric Furnaces keep the pouring ladles full, producing alloys with exact metallurgical and physical characteristics melt after melt. The fast, efficient operation of these furnaces maintains high production levels and high standards of economy.

For melting ferrous or non-ferrous metals, these indirect arc furnaces have many advantages; easy, positive control; uniformity of melts; thorough mixture of elements through the melts; optimum use of power; less metal shrinkage; more heats per day; easy shell replacement.

Furnaces are available in 10 to 4,000 lbs. capacity, designed specifically to fit your electrical specifications. Get full information. Write today!

## in operation AT ATLANTIC CITY MAY 1-7

**See this Detroit furnace in operation at our booth at the Foundry Show. It will be melting alloy iron used in an interesting shell molding demonstration by The Borden Co.**

## DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Elsa" Ltd., Sao Paulo, CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

*This* **INSIGNIA**

## Is Your GUARANTEE of Product Reliability Fostered Through Progressive *Group Activity and Leadership* in Serving the Foundry Industry

### WHAT F.E.M.A. DOES:

- Fosters member co-operation
- Improves trade relations
- Promotes industry recognition
- Stimulates foundry research
- Co-operates with allied organizations
- Compiles trade information
- Stimulates better foundry equipment

***May We Remind You:***
***"A Mechanized Foundry Benefits Everyone!"***

### MEMBERSHIP ROSTER

Ajax Flexible Coupling Company Inc.
Allis-Chalmers Manufacturing Company
Alloy Metal Abrasive Company
American Air Filter Company Inc.
American Wheelabrator & Equipment Corporation
The C. O. Bartlett & Snow Company
Beardsley & Piper, Div. of Pettibone Mulliken Corporation
The Berkshire Manufacturing Company
Buell Engineering Company, Inc.
Edwin S. Carman, Inc.
Clearfield Machine Company
Cleveland Metal Abrasive Company
Davenport Machine & Foundry Company
Wm. Demmler & Bros.
Detroit Electric Furnace Div., Kuhlman Electric Company
Diamond Clamp & Flask Company
The Federal Foundry Supply Company
The Foundry Equipment Company
Foundry Services & Equipment Corporation
Giffels & Vallet, Inc.
Great Western Manufacturing Company
Herman Pneumatic Machine Company
Hickman, Williams & Company
Hines Flask Company
Hydro-Blast Corporation
Industrial Equipment Company
Iron Lung Ventilator Company
The Jeffrey Manufacturing Company
Link-Belt Company
The MacLeod Company
Mathews Conveyer Company
Modern Equipment Company
National Metal Abrasive Company
Newaygo Engineering Company
New Haven Vibrator Company
Norwalk Valve Company
The Osborn Manufacturing Company
Pangborn Corporation
Parsons Engineering Corporation
Penn Iron Works
Pittsburgh Crushed Steel Company
N. Ransohoff, Inc.
Redford Iron & Equipment Company
Robins Conveyors Div., Hewitt-Robins Inc.
Roots-Connersville Blower Corporation
Royer Foundry & Machine Company
Ruemelin Manufacturing Company
Claude B. Schneible Company
Schramm, Incorporated
Simplicity Engineering Company
The W. W. Sly Manufacturing Company
S.P.O., Incorporated
Spencer Turbine Company
Standard Conveyor Company
Steelblast Abrasives Company
Sterling Wheelbarrow Company
Sturtevant Div., Westinghouse Electric Corporation
Tabor Manufacturing Company
Thermix Corporation
Vapor Blast Manufacturing Company
Wadsworth Equipment Company
W. B. Wallis, Pres. (Pittsburgh Lectromelt)
Whiting Corporation

**FOUNDRY EQUIPMENT MANUFACTURERS ASS'N INC.**
**Address: Engineers Building, Cleveland 14, Ohio**

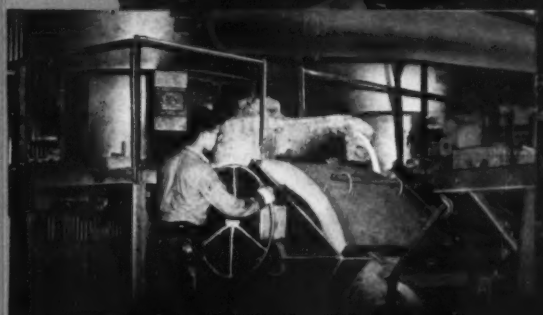
# MODERN FOUNDRY EQUIPMENT

## AT THE HEART OF THE SHOW

Atlantic City May 1 Through 7

**BOOTHS 710-809**

126,000 square feet of exhibit space as set up for your pleasure by the American Foundrymen's Society



MODERN reservoir ladle receiving metal through a front slagging spout in front of two, MODERN, No. 8 cupolas at Somerville, N.J. A MODERN, heavy duty, swivel charger is employed.

Receiving Ampco (Aluminum Bronze) at the electric furnace. Metal is transferred from daily to mold, and poured, with a Model E MODERN Pouring Device.

Ever since the development of the one-man, mechanical POURING DEVICE — more than thirty years ago — MODERN EQUIPMENT products have helped to make easier all foundry work while boosting tonnages at the pay scales . . .

Several of these MODERN, pioneering developments will be on display at Atlantic City. And whether your special interest centers in a 6000 pound, geared, reservoir ladle or around a ladle of only 100 pounds capacity, to operate with detachable ball and Pouring Device, you'll find them at the show — UNDER POWER!

We'll be mighty happy to welcome you at the heart of the show in

**BOOTHS 710 AND 809**

**MODERN EQUIPMENT COMPANY**

**PORT WASHINGTON, WISCONSIN**

# let's get to the "Core"

SWAN-FINCH

Established 1853

®

*be sure to ask about Jetbond 300*

A few minutes with a Swan-Finch engineer at the Foundry Show may be all you need to iron out most of your "core" headaches . . . come up with the right answers.

The right SAFCO core oil or binder—instead of new ovens and oven equipment—might be all the *modernizing* your core room needs to take it out of the bottleneck class.

So stop by with your baking problems; stories of weak and soft cores; shake-out headaches, high cleaning room costs, and irritating smoke and gas problems. We are confident that our over forty years of field-tested foundry experience can help you. Talk over your conditions with us at —

**BOOTH 1623**

**International Foundry Congress & Show**

**MAY 1st—7th**

**Convention Hall, Atlantic City, N. J.**

1619

## SWAN-FINCH OIL CORPORATION

205 EAST 42nd STREET • NEW YORK 17 • NEW YORK

BUFFALO • CHICAGO • DETROIT

"We'll never have to weigh another alloy charge for the cupola"

It's easier for everybody when counting eliminates trips to the scale.

**OHIO FERRO-ALLOYS PRODUCTS**

FERRO-SILICON - 50 - 65 - 75 - 85 - 90%
LOW CARBON FERRO-CHROME SILICON
• SPECIAL BLOCKING 50% FERRO-SILICON • FERRO-MANGANESE •
HIGH CARBON FERRO-CHROME
• BOROSIL • SIMANAL

**BRIQUETS**

SILICON • MANGANESE
• SILICO - MANGANESE
• CHROME

## OHIO FERRO-ALLOYS BRIQUETS

Reduce your labor cost . . . Make it easy for the man at the cupola charging door to make exactly the right additions. Ohio Ferro-Alloys briquets provide excellent insurance against error in charging.

*See Us in Booth 227*

PHILO · TACOMA · BRILLIANT

*Ohio Ferro-Alloys Corporation*
*Canton, Ohio*

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles

**DOW CORNING SILICONES**

*Solve another production problem*

FIRST IN SILICONES
DOW CORNING 7 EMULSION
SILICONE RELEASE AGENT FOR RESIN BONDED SAND SHELL MOLDS
NET WT. • LOT NO.
DOW CORNING CORPORATION MIDLAND MICHIGAN U.S.A.

***UNEQUALLED AS A PARTING AGENT IN THE SHELL PROCESS FOR CASTING METALS***

**Dow Corning 7 Emulsion is specified by the most extensive users of this new foundry process. Easily applied by spraying or dipping,**

***P.S. VISIT OUR BOOTH NO. 1237***

**DOW CORNING 7 EMULSION**

- Provides fast, clean release of sand shell molds; speeds production.
- Reduces build-up on patterns; helps to maintain close tolerances; cuts cleaning costs and lengthens the life of patterns.
- Gives superior reproduction; improves surface finish; reduces rejects and machining.
- Applied once, will release several molds; saves time.

Easily diluted with water and effective at low concentrations, Dow Corning 7 Emulsion is nonflammable and noncorrosive; safe and easy to use.

*Send Today* FOR SAMPLE OF DOW CORNING 7 EMULSION
or write Dept. AV-16 for Data Sheet

**DOW CORNING CORPORATION**

DOW CORNING SILICONES

ATLANTA
CHICAGO
CLEVELAND
DALLAS
LOS ANGELES
MIDLAND, MICH.
NEW YORK
WASHINGTON, D. C.

In Canada: Fiberglas Canada Ltd., Toronto
In England: Midland Silicones Ltd., London

THE SYMBOL OF OUTSTANDING MERIT

# DISTINCTIVE in CONTRIBUTING to better METALS MELTING PRODUCTION

In an unusually short span of time, the Hy-Temp Refracto line of extreme temperature-resisting refractories has won singular recognition in the field.

Today Hy-Temp Refracto Bricks, Bonding Cements, Electric Furnace Bottoms and special purpose Plastic Refractories continue to contribute numerous benefits in the foundry industry. Increased melting capacities; greater number of heats; reduced down time; lower maintenance costs. . . . These are advantages enjoyed by H.T.R. users. These are advantages familiar to those who specify H.T.R. for best results by far!

H.T.R. Service Engineers will be glad to analyze your refractory problems. Write for complete, competent recommendations—furnished without obligation. Bulletins are available on H.T.R. Refractory Brick, Bonding Cement, Induction Furnace Ram Mix, Plastic Bond High Temperature Cement, Electric Furnace Bottom Mix and Cupola Shell Linings.

**OTHER NATIONAL FOUNDRY SUPPLIES**

**Fire Brick, Fire Clay, Firestone, Core Binder, Shot and Grit, Molding Sand, Bank Sand, Sand Blast Sand, Lake Sand, Silica Sand and Flour, Limestone, Iron Oxide, Mill Stars, Hi-Temp-Gun Ganister, Volclay and Panther Creek Bentonites, Zircon Sand and Flour, Cuplopax (Gun Blown Refractory), Ladle Linings, Air Setting Refractory Cement and Castables.**

HTR HY-TEMP REFRACTO MATERIALS

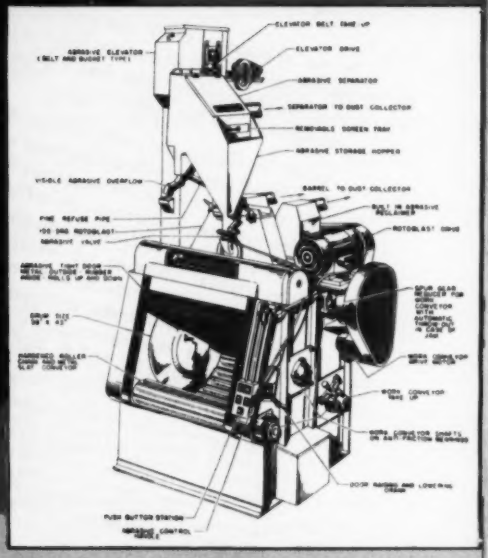
**NATIONAL FOUNDRY SAND CO.**

• BONDING CEMENTS • ELECTRIC FURNACE LININGS AND BOTTOMS

EXECUTIVE OFFICES 2[illegible] WEST GRAND BLVD. DETROIT MICHIGAN

# Pangborn®

*For detailed descriptions of these outstanding features, see column at right.*



## Premier Showing—Atlantic City, N. J., May 1-7, 1952
## International Foundry Congress, Booth 1733

***See new barrel—and other machines—in operation***

# announces a NEW ROTOBLAST® Barrel

## NEW Airless Barrel has many outstanding features

- ***A Batch Cleaning Barrel*** of advanced design that uses the famous ROTOBLAST® cleaning efficiency to give higher production at lower cost.
- ***Work Conveyor*** will not clog. Hardened steel chain with special metal slats designed so no aperture will pinch work.

  Drives through V-Belt to Spur Gear-Reducer mounted directly on work conveyor shaft—simple—effective—safe.

  ***Take-Up*** is on bottom shaft where weight of conveyor makes it easier to adjust.
- ***Automatic Throw-Out Torque Arm*** protection disengages the barrel drive in case of jams. Works in both loading and unloading directions.
- ***Abrasive-Tight Door and Housing*** keeps abrasive within machine, permits economical use of the newer types of abrasives.
- ***Abrasive-Tight Door.*** Woven wire mesh construction backed with vulcanized rubber. Rolls up compactly when door is opened. Slides on rollers in mechanized labyrinth. Always protected against abrasive action and tumbling castings by heavy rubber curtain.
- ***Cleaning and Reclaiming System***—new—constantly removes all sand and debris, continuously maintaining full cleaning potential of abrasive.
- ***Work Loader***—quick acting—double cables for safety—positively delivers entire load to machine.
- ***Control Panel***—push button type—centrally located.
- ***Two Sizes Now Available***—6 cu. ft. and 12 cu. ft. capacity. Other sizes on drawing boards.
- ***Minimum Floor Space and Head Room***
  6 cu. ft. capacity—6′ 8″ deep x 6′ 0″ wide x 13′ 9⅞″ high.
  12 cu. ft. capacity—7′ 9″ deep x 9′ 7″ wide x 14′ 6″ high.

FEMA

**Pangborn**

**BLAST CLEANS CHEAPER**

**with the right equipment for every job**

## Win a $1000 U.S. Bond (Series E) for Name of NEW Barrel!

Here's your chance to win a $1000 Series E United States Savings Bond—just by submitting a winning name for the new Pangborn ROTOBLAST Barrel announced in this ad. It's new—it'll be on display for the first time—and in operation—at the International Foundry Show in Atlantic City, May 1-7. Take a good look at its features—check its advantages—then give it a name, using the handy entry blank below. Don't miss this chance to win a $1000 Bond—send in as many names as you can.

### CONTEST RULES

- The name selected must be suitable for Trademark Registration. (Any name too close to names already in use would not be suitable.)
- Any person residing in the continental United States may submit entries—except employees and the families of employees of the Pangborn Corporation and its various agencies.
- No limit to the number of names you may submit.
- In case of duplication of winning name, the one bearing the earliest postmark will be declared the winner.
- The company need not use the name submitted even when the prize is awarded.
- No entries can be returned, and all entries become the sole property of the Pangborn Corporation.
- Entries must be postmarked not later than midnight, May 24, 1952.
- Decision of the judges will be final.

### MAIL THIS COUPON—FILL IN DETAILS

PANGBORN CORPORATION, 1300 Pangborn Blvd., Hagerstown, Md.

My suggestion[s] for the name of the new Pangborn Barrel is [are]: _____

My Name _____

My Occupation _____

Street Address _____

City _____ Zone _____ State _____

My Company is _____

# Bringing Together

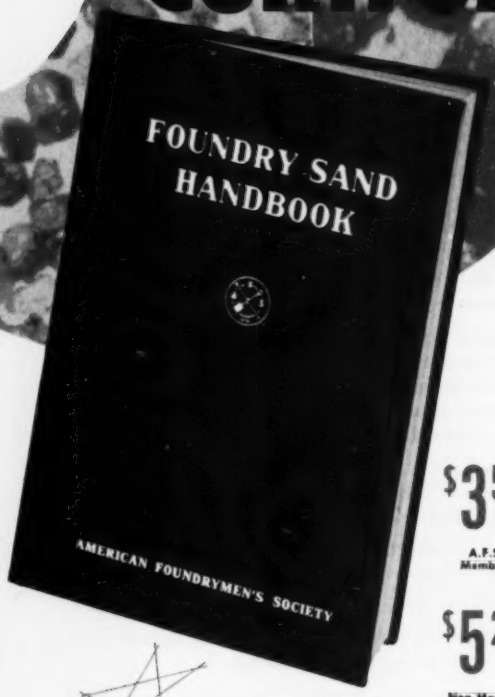
PRINCIPLES, STANDARDS, FACTS AND TABLES PERTAINING TO

# SAND Control

## *A casting is only as good as the mold!*

A foundryman may select his metal with the greatest of care. His melting procedure may be in accordance with recommended practice. And he may exercise full control over his pouring temperatures and pouring methods. BUT . . . he cannot consistently produce quality castings in molds prepared from uncontrolled sand mixtures.

That's why Sand Control is of vital importance to every foundry. That's why the FOUNDRY SAND HANDBOOK, completely revised, is such a tremendous help in achieving consistent sand control.




## *Contents include:*

***Methods for Sampling Foundry Sands and Clays***
***Preparing Foundry Sand Mixtures for Testing***
***Methods for Determining Fineness of Foundry Sands—Standard***
***Determining Moisture in Foundry Sand Mixtures—Standard***
***Determination of Permeability of Foundry Sands***
***Strength of Foundry Sand Mixtures***
***Method for Determination of Green Surface Hardness—Standard***
***Determining the Sintering Point of Sand Mixtures***
***Elevated Temperature Tests on Foundry Sand Mixtures***
***Chemical Analysis of Sand—Non-Standard Tests***
***Tentative Method of Testing Core Binders (Tensile Strength)***
***Mechanical Properties of Core Sand Mixtures***
***Method for Determining Strength of Core Paste—Tentative Standard***
***Non-Standard Tests***
***Interpretation of Room Temperature Sand Tests***
***Comments on Maintenance of Testing Equipment***
***Foundry Molding Sand Mixtures***
***Conversion Tables***
***Terms Used in Foundry Sand Work***
***Bibliography on Sand Testing and Control***
***Subject Index***

265 pages . . . 23 separate sections . . . 93 illustrations . . . 13 tables . . . add to the completeness of this 6th edition of the cloth-bound A.F.S. FOUNDRY SAND HANDBOOK.

**$3.50** A.F.S. Members

**$5.25** Non-Member Price

**AMERICAN FOUNDRYMEN'S SOCIETY**
616 SOUTH MICHIGAN AVENUE • CHICAGO 5, ILLINOIS

Please send me promptly _____ copies of "FOUNDRY SAND HANDBOOK."

I enclose $_____ ☐ Cash ☐ Money Order ☐ Check to cover.

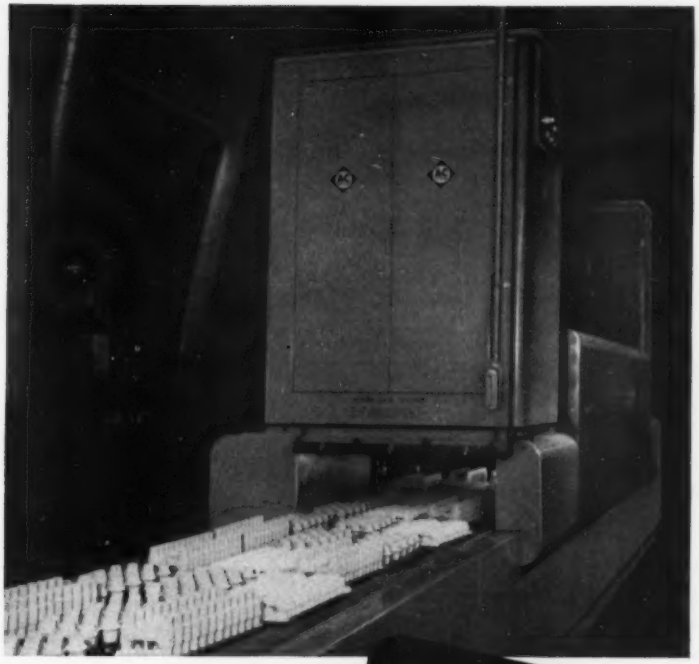
Name .....

Company .....

Address .....

City ..... P. O. Zone ..... State .....

*Postage paid by A.F.S. when remittance accompanies order.*



FOUNDROMATIC *Dielectric* SAND CORE DRYER

# WHY PAY A Premium for Cores?

CUT CORE COSTS to the bone with reductions like these:

- **Reduce high handling costs 60-80%! Cores need only be moved twice: once to the dryer and then to the molder. No collecting, cooling, or storage handling required.**
- **Cut long drying cycles by 80%! Cores are dried in minutes instead of hours.**
- **Cut high fuel bills 60%! All the heat goes into the core. Best of all, short warm-up time permits turning off unit when not in use.**
- **Reduce your reject pile. Overbaking of cores and burning of fins and thin sections is eliminated.**
- **Put those big core storage spaces into production space. Make cores as you need them.**

The amazing thing is that these are not the only benefits. There are advantages in shakeout, improvements in core and casting quality, and improvements in working conditions.

We urge you to investigate this revolutionary development in core making.

Call your nearby Allis-Chalmers district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3596

*Foundromatic* is an Allis-Chalmers trademark.

## THE CORE BOX

**Questions and Answers About Dielectric Sand Core Drying**

*1. Is any special or additional equipment needed when using a dielectric sand core dryer?*

None, except plastic dryers to hold shaped cores. Marinite, transite, or plywood plates are recommended.

*2. Can you use metal dryers or plates?*

You can, but it will result in reduced production. The metal will act as a shield around the sand, requiring the core to be run a second time without the dryer or plate.

*3. How many plastic dryers will be needed?*

Far less than the normal amount of metal dryers. A maximum of 50 plastic dryers should suffice for each job unless more than one coremaker is working on the same job.

*4. Can core rods or nails be used to help support cores?*

Yes. For best results, rods or nails should be parallel to electrodes. If it is necessary to place rods or nails vertically in the core, they should be of minimum size in relation to core mass and should not protrude through surface of sand.

*5. Will light sections burn if dried with heavy sections?*

No. Cores will not burn in the *Foundromatic* core dryer.

*6. What about moisture pickup by stored cores?*

Moisture pickup should be no more than with oil sand. Proper cure will produce a core that is practically impervious to moisture. Excessive amounts of cereal will contribute to moisture pickup. The big advantage is that production can be arranged to require a minimum storage of cores when *Foundromatic* dryers are used.

*7. Can I add materials to increase hot strength?*

Yes. Iron oxide, silica flour or Bentonite may be added to core mix, but will reduce the production as these materials naturally close the sand up, retarding the escape of moisture.

*8. Is equipment safe from the standpoint of burns or shock?*

Yes. Access doors are interlocked to shut off all power when opened.

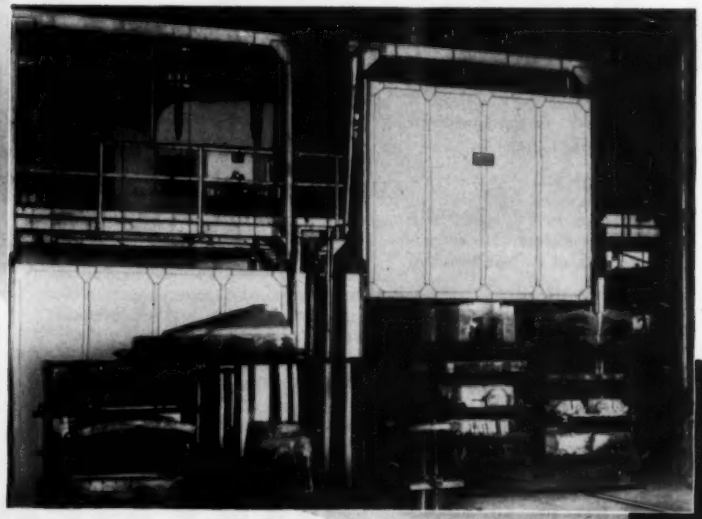
# ALLIS-CHALMERS

# COLEMAN

## FOR MORE AND BETTER

## *at lower cost than*

*Coleman Car-Type Mold Ovens*



*Coleman Car-Type Core Ovens*

# OVENS
## CORES AND MOLDS
## *any other method...*

**BAKING AND DRYING TIME REDUCED** regardless of size and shape of cores and molds.

**MOST EFFICIENT HANDLING METHODS** for your type of work and plant conditions . . . eliminate delays and losses.

**PERFECT CORE BAKING** ends manpower and casting losses due to make-overs and rejects.

**PERFECT MOLD DRYING** for true-to-pattern castings and easy cleaning.

**INCREASED PRODUCTION** by making the most efficient use of skilled and unskilled labor.

**HEAVY DUTY CONSTRUCTION** for continuous dependable performance, economical operation, and minimum maintenance cost.

**GREATEST SAVINGS IN FUEL** by using the most economical fuel available.

**SAVE BINDER.** Proper core baking atmosphere and uniform temperature permit important savings in conventional binders.

**USE HIGH SPEED CORE BINDERS.** Coleman ovens have uniform temperature and accurate control to handle temperature-sensitive resins and pre-baked oils.

***50 YEARS OF FOUNDRY OVEN SPECIALIZATION IN EVERY COLEMAN OVEN***

★

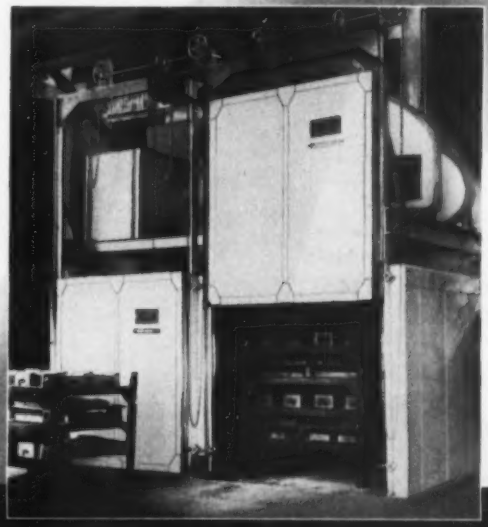
**A COMPLETE RANGE OF TYPES:**

**COLEMAN OVENS** are built in a complete range of sizes and capacities for every core-baking and mold drying requirement: Tower Ovens, Horizontal Conveyor Ovens, Car-Type Ovens, Transrack Ovens, Rolling Drawer Ovens, Portable Core Ovens, Portable Mold Dryers, etc.

***Write for Bulletin 48***

*Coleman Tower® Core Oven*

*Coleman Transrack Core Ovens*



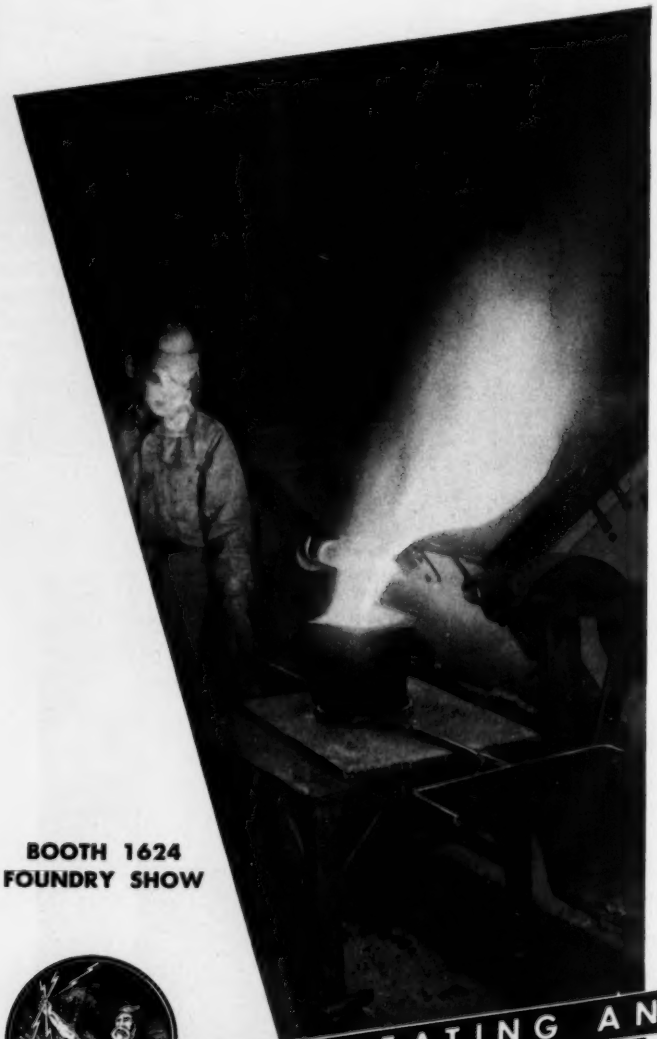
# THE FOUNDRY EQUIPMENT CO.

**1831 COLUMBUS ROAD** **CLEVELAND 13, OHIO**

**WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS**

# Save critical alloys

## WITH AJAX-NORTHRUP INDUCTION MELTING



**BOOTH 1624**
**FOUNDRY SHOW**

High speed melting enables Ajax-Northrup high-frequency furnaces to recover *all* of the nickel in the charge, 99% of the chromium, 95% of the molybdenum . . . consistently high percentages of every alloying element.

The difference between these figures and the performance of ordinary furnaces represents *savings* . . . both of money, and of critically hard-to-get alloys.

For instance, a 2% chromium saving in one Ajax-Northrup equipped foundry saves ten tons of ferrochrome a month, or $60,000 a year. (Melting capacity 1,000,000 lbs. a month—63% ferrochrome @ 25¢/lb.)

$60,000 a year pays for the furnaces in short order—and the chromium saved is enough for an extra 70,000 pounds of 18 and 8 stainless steel a month.

The figures are slightly different for other critical alloying elements. But the arithmetic's the same—the total savings frequently just as impressive.

Besides saving metals, Ajax-Northrup furnaces melt at extremely high speed, with composition controlled within 0.25%, pouring temperatures within 20°F.

There's an Ajax-Northrup furnace to fit every melting job, including yours. Write us today for details.

*SEND FOR NEW INDUCTION HEATING AND MELTING BULLETIN*

**FOR HEATING AND MELTING**

139

AJAX NORTHRUP

*Associate Companies*
AJAX ELECTRO METALLURGICAL CORP.
AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

**AJAX ELECTROTHERMIC CORPORATION**
**AJAX PARK**
**TRENTON 5, NEW JERSEY**

# SIMPLICITY model V-S conveyors help speed production and cut costs of handling hot foundry sand

At a foundry producing a variety of malleable iron castings, this 36" x 30' Simplicity Model V-S Conveyor moves hot sand from two shakeouts up a 3° incline to an elevator at an average rate of 80 tons with a peak load of 120 tons per hour. As the sand moves along the conveyor, water is added and plows turn the sand thus reducing the sand temperature 100°. The sand is discharged into the elevator boot over a permanent magnet that removes all metal particles.

Simplicity Conveyors and Os-A-Veyors greatly simplify the movement of sand and castings and hot abrasive materials in foundries. They can be installed to carry most any type or quantity of material you need. Simplicity Conveyors and Os-A-Veyors are easy and inexpensive to operate, maintain and repair.

**STOP IN AND SEE US . . . SPACE 1335 INTERNATIONAL FOUNDRY CONGRESS AND SHOW AT ATLANTIC CITY.**

112

- Sales representatives in all parts of the U. S. A.
- FOR CANADA: Canadian Bridge Engineering Co., Ltd., Walkerville, Ontario
- FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, New York

**Simplicity**
TRADE MARK REGISTERED

**ENGINEERING COMPANY • DURAND, MICHIGAN**

Advertisement

# ELECTROMET Data Sheet

Published by Electro Metallurgical Company, A Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

## ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

### BORON ALLOYS

| PRODUCT* | NOMINAL COMPOSITION | USES |
|---|---|---|
| **Ferroboron** Min. 10.00% Boron Grade | Silicon.....max. 1.50%<br>Aluminum.....max. 0.50%<br>Carbon.....max. 1.50% | Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys. |
| Min. 17.50% Boron Grade | Silicon.....max. 1.50%<br>Aluminum....max. 0.50%<br>Carbon.....max. 0.50% | |
| **Manganese-Boron** | Boron.....min. 17.50%<br>Manganese...approx. 75%<br>Silicon.....max. 1.50%<br>Carbon.....max. 3%<br>Iron.....max. 5% | Used to cleanse and deoxidize non-ferrous alloys. |
| **Nickel-Boron** | Boron.....15 to 18%<br>Silicon.....max. 1.50%<br>Aluminum.....max. 1.00%<br>Carbon.....max. 0.50%<br>Iron.....max. 3.00%<br>Nickel.....Balance | Special boron alloy used principally for deoxidizing nickel and its alloys. |
| **Boron Carbide** | Boron.....45 to 50%<br>Carbon .....45 to 50% | Deoxidizer for non-ferrous alloys. |
| **Calcium Boride** | Boron.....38 to 42%<br>Calcium.....27 to 32%<br>Carbon.....15 to 20% | Welding rod coating. |
| **SILCAZ Alloy** | Boron.....0.55 to 0.75%<br>Silicon.....35 to 40%<br>Calcium.....9 to 11%<br>Aluminum.....6 to 8%<br>Titanium.....9 to 11%<br>Zirconium.....3 to 5% | A complex boron addition agent for increasing the hardenability of steel. |

### CALCIUM ALLOYS

| | | |
|---|---|---|
| **Calcium-Silicon** | Calcium.....30 to 33%<br>Silicon.....60 to 65%<br>Iron.....1.50 to 3% | Deoxidizer for quality ingot steel. Also used in high-tensile gray irons. |
| **Calcium-Manganese-Silicon** | Calcium.....16 to 20%<br>Manganese.....14 to 18%<br>Silicon.....53 to 59% | A complex deoxidizer used widely in production of steel castings. |
| **Calcium Metal** | | Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium. For special applications requiring calcium of very high purity. |
| Regular Grade | Calcium.....98% (Cylinders, Slabs, Cut Pieces, or Turnings) | |
| Distilled Grade | Calcium...approx. 99.90% (Irregular pieces from pea size to 14 in. lumps) | |

### CHROMIUM ALLOYS

| | | |
|---|---|---|
| **Low-Carbon Ferrochrome** | Chromium.....67 to 71%<br>Silicon.....0.30 to 1.00%<br>Carbon (10 Grades) max. 0.03 to max. 2.00% | Production of stainless steels and high-temperature alloys requiring low carbon content. |
| **High-Carbon Ferrochrome** | | |
| Max. 4.50, 5.00, or 6.00% Carbon Grade | Chromium.....67 to 70%<br>Silicon..... 1 to 2% | For production of engineering alloy steels and other alloy steels of moderate chromium content. |
| Max. 7.00% Carbon Grade | Chromium.....66 to 69%<br>Silicon..... 1 to 3% | |
| Min. 7.00% Carbon Grade | Chromium.....65 to 68%<br>Silicon..... 1 to 3% | |
| **Nitrogen-Bearing Low-Carbon Ferrochrome** | Chromium.....67 to 71%<br>Silicon.....0.30 to 1.00%<br>Carbon.....max. 0.10%<br>Nitrogen....approx. 0.75% | For additions of nitrogen to improve properties of high-chromium steels. |
| **"SM" Ferrochrome** | Chromium.....60 to 65%<br>Silicon ..... 4 to 6%<br>Carbon..... 4 to 6%<br>Manganese..... 4 to 6% | A high-solubility chromium addition for steel or iron in either furnace or ladle. |

| PRODUCT* | NOMINAL COMPOSITION | USES |
|---|---|---|
| **CHROMIUM ALLOYS cont.** | | |
| **Foundry Ferrochrome** High-Carbon Grade | Chromium.....62 to 66%<br>Silicon..... 7 to 10%<br>Carbon..... 5 to 7% | Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron. |
| Low-Carbon Grade | Chromium.....50 to 54%<br>Silicon.....28 to 32%<br>Carbon.....max. 1.25% | |
| **Chromium Metal** | Chromium.....min. 97% | |
| Low-Carbon Grades | Carbon .....max. 0.10% and 0.50%<br>Iron.....max. 1% | Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys. |
| High-Carbon Grade | Chromium.....87 to 90%<br>Carbon..... 9 to 11%<br>Iron.....max. 1.25% | |
| **"EM" Ferrochrome-Silicon** | | In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath. |
| No. 1 Grade | Chromium.....39 to 41%<br>Silicon.....42 to 46%<br>Carbon.....max. 0.05% | |
| No. 2 Grade | Chromium.....36 to 39%<br>Silicon.....36 to 39%<br>Carbon.....max. 0.05%<br>Aluminum..... 7 to 9% | |
| **"EM" Ferrosilicon-Chrome** | Chromium.....50 to 54%<br>Silicon.....28 to 32%<br>Carbon.....max. 1.25% | For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium. |
| **"EM" Chromium Briquets** (Hexagonal Shape) | Chromium.....2 lb.<br>Total Weight.....3¼ lb. | For adding chromium to cast iron in the cupola. |

### COLUMBIUM ALLOYS

| | | |
|---|---|---|
| **Ferrocolumbium** | Columbium.....50 to 60%<br>Silicon.....max. 8%<br>Carbon.....max. 0.40% | Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys. |
| **Ferrotantalum-Columbium** | Columbium...approx. 40%<br>Tantalum.....approx. 20%<br>Cb+Ta .....min. 60%<br>Silicon.....4 to 6%<br>Carbon.....max. 0.30% | Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys. |

### MANGANESE ALLOYS

| | | |
|---|---|---|
| **Standard Ferromanganese** Regular Grade | Manganese.....78 to 82%<br>Carbon.....approx. 7%<br>Silicon.....max. 1% | Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron. |
| Low-Phosphorus Grade | Manganese.....78 to 82%<br>Carbon.....max. 7%<br>Silicon.....max. 2%<br>Phosphorus...max. 0.10% | |
| **Low-Carbon Ferromanganese** | Manganese.....min. 90%<br>Carbon.....max. 0.07% | |
| Low-Phosphorus Grade | Phosphorus...max. 0.06% | Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type. |
| Regular Grades | Manganese.....85 to 90%<br>Carbon ....max. 0.07, 0.11 to 0.15, 0.30, or 0.50% | |
| Regular Grade (High-Silicon) | Manganese.....80 to 85%<br>Carbon.....max. 0.75%<br>Silicon..... 5 to 7% | |
| **Medium-Carbon Ferromanganese** | Manganese.....80 to 85%<br>Carbon.....max. 1.25 to 1.50% | For making low- and medium-carbon manganese steel and Hadfield steel. |
| **Silicomanganese** | | |
| Max. 1.50% Carbon Grade | Manganese.....65 to 68%<br>Silicon.....18 to 20% | A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace. |
| Max. 2.00% Carbon Grade | Manganese.....65 to 68%<br>Silicon.....15 to 17.50% | |
| Max. 3.00% Carbon Grade | Manganese.....65 to 68%<br>Silicon.....12 to 14.50% | |

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

| PRODUCT* | NOMINAL COMPOSITION | USES |
|---|---|---|
| **MANGANESE ALLOYS cont.** | | |
| **Low-Iron Ferromanganese** | Manganese.....85 to 90%<br>Carbon.....approx. 7.00%<br>Silicon.....max. 3%<br>Iron.....max. 2% | For high manganese additions to certain non-ferrous alloys, particularly aluminum. |
| **Manganese Metal** | Manganese.....min. 96%<br>Carbon.....max. 0.20%<br>Silicon.....max. 1.00%<br>Iron.....max. 2.50% | Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys. |
| **"EM" Silico-manganese Briquets** (Square Shape) | Manganese.....2 lb.<br>Silicon.....½ lb.<br>Total Weight.....3½ lb. | For adding manganese (with silicon) to cast iron in the cupola. |
| **"EM" Ferro-manganese Briquets** (Oblong Shape) | Manganese.....2 lb.<br>Total Weight.....3 lb. | For adding manganese (without silicon) to cast iron in the cupola. |
| **SILICON ALLOYS** | | |
| **50% Ferrosilicon** | | |
| Regular Grade | Silicon.....47 to 51% | Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency. |
| Blocking Grade | Silicon.....47 to 51% | |
| Low-Aluminum Grade | Silicon.....47 to 51%<br>Aluminum.....max. 0.40% | |
| **65% Ferrosilicon** | | |
| Low-Aluminum Grade | Silicon....61.50 to 66.50%<br>Aluminum.....max. 0.50% | Mainly for production of electrical sheet steel. |
| **75% Ferrosilicon** | | |
| Regular Grade | Silicon.....73 to 78% | Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron. |
| Low-Aluminum Grade | Silicon.....73 to 78%<br>Aluminum.....max. 0.50% | |
| **85% Ferrosilicon** | | |
| Regular Grade | Silicon.....83 to 88% | Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron. |
| Low-Aluminum Grade | Silicon.....83 to 88%<br>Aluminum.....max. 0.50% | |
| **90% Ferrosilicon** | | |
| Regular Grade | Silicon.....92 to 95% | Permits large additions of silicon without harmful chilling effect. |
| Low-Aluminum Grade | Silicon. .....92 to 95%<br>Aluminum.....max. 0.50% | |
| **Silicon Metal** | | Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties. |
| Regular Grade | Silicon.....min. 97 or 96%<br>Iron.....max. 1 or 2% | |
| Purified Grade | Silicon....99.70 to 99.90%<br>Iron.....005 to .015% | For applications in non-ferrous industry requiring silicon of high purity. |
| Low-Calcium Grade | Silicon.....min. 97%<br>Iron.....max. 1%<br>Calcium.....max. 0.10% | For the production of high-silicon aluminum alloys where calcium is detrimental. |
| Low-Aluminum Grade | Silicon.....min. 98%<br>Iron.....max. 1%<br>Aluminum.....max. 0.10% | For the production of silicon-copper alloys where aluminum is detrimental. |
| **"SMZ" Alloy** | Silicon.....60 to 65%<br>Manganese..... 5 to 7%<br>Zirconium..... 5 to 7% | Particularly strong graphitizing inoculant used in making ladle additions to cast iron. |
| **Special Graphitizer** | Ferrosilicon Compound | Acts as both deoxidizer and graphitizer in cast iron. Useful in controlling chilling tendencies. |
| **Magnesium-Ferrosilicon** | Silicon.....approx. 46%<br>Magnesium..approx. 8.5% | For ladle addition to cast iron to obtain special properties. |
| **Barium-Silicon** | Barium.....40 to 50%<br>Silicon.....45 to 55% | For deoxidation of non-ferrous alloys. |
| **"EM" Silicon Briquets** (Cylindrical Shape) | | |
| Large Size | Silicon.....2 lb.<br>Total Weight.....5 lb. | For adding silicon to cast iron in the cupola. |
| Small Size | Silicon.....1 lb.<br>Total Weight.....2½ lb. | |

"Electromet," "EM," "Silcaz," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

| PRODUCT* | NOMINAL COMPOSITION | USES |
|---|---|---|
| **TITANIUM ALLOYS** | | |
| **Ferrotitanium** | Titanium.....27 to 32%<br>Carbon.....max. 0.10% | For adding titanium to stabilized austenitic chromium-nickel stainless steels and to high-temperature metals. |
| **Silicon-Titanium** | Titanium.....40 to 50%<br>Silicon.....45 to 50%<br>Iron.....max. 3% | For additions of titanium to steels or non-ferrous alloys. |
| **Manganese-Nickel-Titanium** | Titanium.....43 to 48%<br>Nickel.....approx. 25%<br>Manganese.....max. 8%<br>Aluminum.....max. 18%<br>Iron.....max. 5% | Deoxidization of nickel alloys. |
| **TUNGSTEN ALLOYS** | | |
| **Ferrotungsten** | Conforming to A.S.T.M. Spec. A 144-39 | For production of tool and die steels; also high-temperature alloys. |
| **Tungsten Metal Powder** | | Production of tungsten steels and cast tungsten carbide. |
| Melting Grade | Tungsten.....min. 98.80%<br>Total Carbon..max. 0.25% | |
| **Calcium Tungstate Nuggets** | Tungstic Oxide..68 to 72% | For production of tool steels and high-temperature alloys by direct reduction. |
| **VANADIUM ALLOYS** | | |
| **Ferrovanadium** | Vanadium.....50 to 55%<br>Carbon....max. 0.20, 0.50, or 3.00%<br>Silicon....max. 1.50, 2.00, or 8% | Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons. |
| **Vanadium Oxide Fused** | $V_2O_5$.....86 to 89%<br>$Na_2O$.....approx. 10%<br>CaO.....approx. 2% | For addition of vanadium to steel and for manufacturing catalysts. |
| Sodium Polyvanadate (Red Cake) | $V_2O_5$.....approx. 85%<br>$Na_2O$.....approx. 9%<br>CaO.....approx. 2%<br>$H_2O$.....approx. 2.5% | For manufacture of vanadium compounds, including vanadium catalysts. |
| High-Purity Ammonium Metavanadate | $V_2O_5$.....approx. 99.50%<br>$NH_4VO_3$.....min. 99% | |
| **ZIRCONIUM ALLOYS** | | |
| **12 to 15% Zirconium Alloy** | Zirconium.....12 to 15%<br>Silicon.....39 to 43%<br>Carbon.....max. 0.20% | This zirconium alloy is a powerful deoxidizer. It also increases depth of hardening. |
| **35 to 40% Zirconium Alloy** | Zirconium.....35 to 40%<br>Silicon.....47 to 52%<br>Carbon.....max. 0.50% | Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium. |
| **Nickel-Zirconium** | Zirconium.....25 to 30%<br>Nickel.....40 to 50%<br>Aluminum....approx. 15%<br>Silicon.....max. 10%<br>Iron.....max. 5% | Effective for deoxidizing and degasifying nickel and its alloys. |

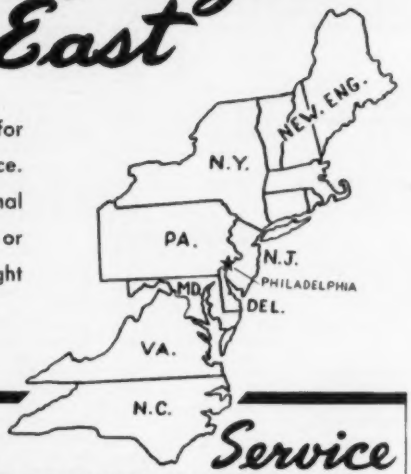
## IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

Birmingham 3, Ala.....Brown-Marx Building
Chicago 1, Ill.....230 N. Michigan Avenue
Cleveland 14, Ohio.....Union Commerce Building
Detroit 2, Mich.....6-240 General Motors Building
Los Angeles 58, Calif.....2770 Leonis Boulevard
New York 17, N. Y.....30 East 42nd Street
Pittsburgh 22, Pa.....2207 Oliver Building
San Francisco 6, Calif.....22 Battery Street
In Canada: Electro Metallurgical Company of Canada Limited, Welland, Ontario

# FOUNDRY SUPPLIES AND EQUIPMENT .... *Largest stocks in the East*

We proudly and sincerely state that we carry everything for the foundry and have built an enviable record for service. We are in a unique position to fill your orders with exceptional speed—a phone call, wire or letter will place any supplies or equipment on your foundry floor quicker than you ever thought possible.




## DISTRIBUTORS FOR:

**BEARDSLEY & PIPER DIVISION**
Sandslingers — Sand Conditioners

**BLACK, SIVALLS & BRYSON, INC.**
Steel Flasks

**CHAMPION FOUNDRY & MACHINE CO.**
Molding Machines — Core Blowers

**DELTA OIL PRODUCTS CO.**
Core Washes — Binders — Core Oils

**WM. DEMMLER & BROS.**
Core Blowers

**HARRY W. DIETERT CO.**
Sand Testing Equipment

**GENERAL FOODS CORP.**
Cereal Binder

**GRINDLE CORP.**
Cupolas — Furnaces — Chargers — Air Purification

**HARBISON-WALKER REFRACTORIES CO.**
Fire Clay and High Alumina Refractories

**INDUSTRIAL EQUIPMENT CO.**
Ladles — Shanks — Tongs

**INTERNATIONAL PAPER CO.**
Bindarene

**IRONTON FIRE BRICK CO.**
Foundry Refractories

**JOHNSTON & JENNINGS CO.**
Molding Machines

**NATIONAL LEAD COMPANY —BAROID SALES DIVISION**
National Bentonite

**NEW HAVEN VIBRATOR CO.**
Branford Vibrators

**OREFRACTION, INC.**
Zircon Sand — Flour

**PITTSBURGH METALS PURIFYING CO.**
Soffel's Flux

**STOLLER CHEMICAL CO.**
Akro Compound

**REDFORD IRON & EQUIPMENT CO.**
Redford Core Blowers

**STROMAN FURNACE & ENGINEERING CO.**
Metal Melting Equipment

**WADSWORTH EQUIPMENT CO.**
Core Machines

## *24 Hour Service*

### . . . IF YOU ARE LOCATED IN THIS AREA

Within sight of the main line of the Penna. RR to New York to which we have direct connection . . . with easy access to all other roads via the belt line possessing shipside spurs as well . . . with loading and unloading facilities for numerous trailer trucks . . . we are unusually well equipped to get that "must" order off tonight. Wire, phone or write. Learn at first hand the efficiency of our service which has built the largest business of its kind devoted to the great Foundry Industry of the East.

**SEE US AT ATLANTIC CITY . . . BOOTH No. 309-311**

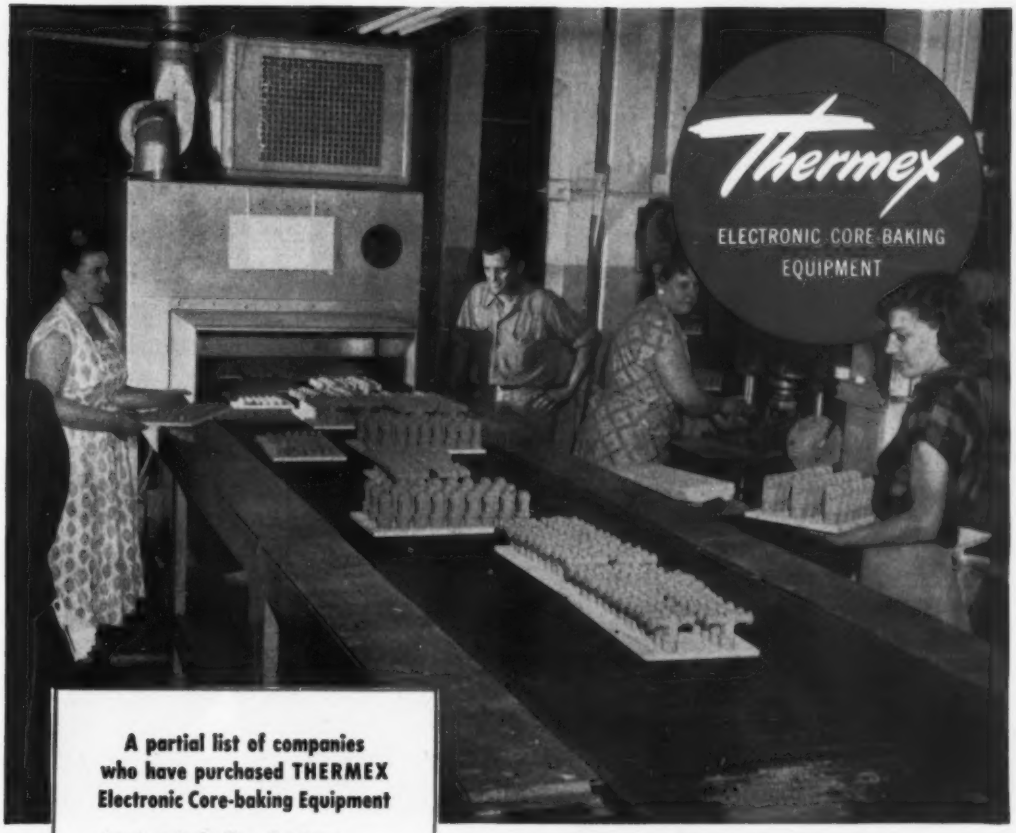
**FROM THE SMALLEST ITEM IN FOUNDRY SUPPLIES, TO THE LARGEST ITEM OF EQUIPMENT... ASK US ABOUT IT, ANY TIME**

PENNSYLVANIA FOUNDRY SUPPLY & SAND CO. SUPPLIES EQUIPMENT Everything

## PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.

ASHLAND & EAST LEWIS STREETS

PHILADELPHIA 24 Telephone JE 5-1012




**A partial list of companies who have purchased THERMEX Electronic Core-baking Equipment**

American Brake Shoe Company
American Hardware Corporation
Brugger Mfg. Company
James B. Clow & Sons
Crane Company
Drake Non-Clinkering Furnace Block Co., Inc.
Ford Motor Company
Fundicao Tupy
Grand Haven Brass Foundry
Grinnell Corporation
Moline Malleable Iron Company
Mueller Company
National Malleable & Steel Castings Co.
Ontario Malleable Iron Co., Ltd.
Phoenix Brass Fittings Corp.
Ronci Co., Inc.
Sterling-Faucet Company
U. S. Pipe & Foundry Company
Walworth Company

## Cuts core-baking time!

SINCE replacing conventional gas ovens with THERMEX® Core-baking Equipment, the Walworth Company has greatly increased foundry productivity.

Major improvements in employee working conditions accompany the production boost. The work area is comfortably cool, without oven heat. Cores are cool enough to handle immediately after baking, without danger of burns.

Why not take advantage of the cost-cutting, labor saving advantages of THERMEX Core-baking Equipment? Girdler makes dielectric core-baking equipment in capacities from ½ ton to 15 tons per hour. For complete information write The Girdler Corporation, Thermex Division, Louisville 1, Ky.

The GIRDLER Corporation
THERMEX DIVISION

# How YOUR Metal Situation is Helped When a Salesman Turns Reporter

Today's non-ferrous metals picture will very likely change tomorrow. Prices, quantities, regulations and availabilities change fast and often. The foundryman who gets the latest news is often the one who produces *and profits* while others wait.

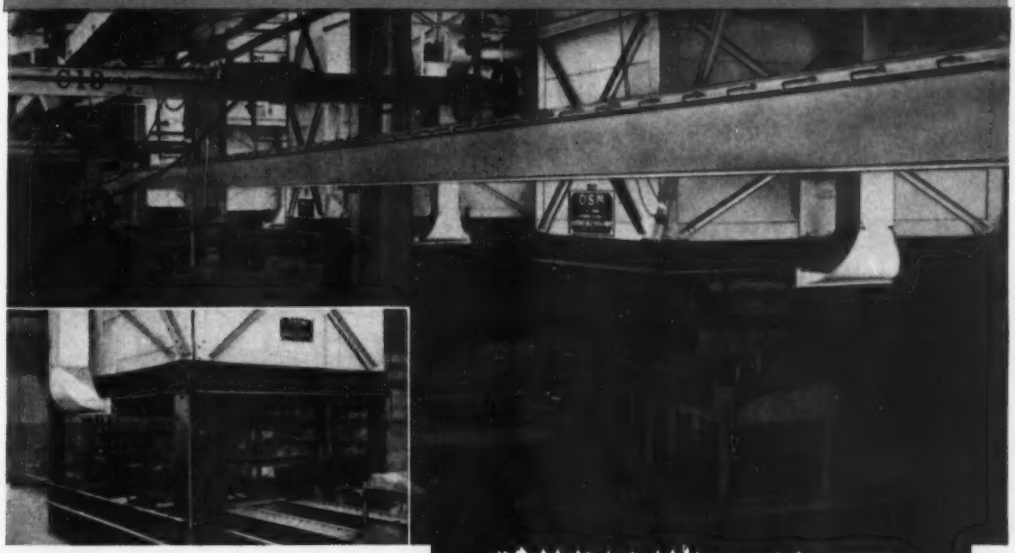
By reporting metal facts to you speedily and accurately your Federated salesman helps keep you posted. From metals headquarters . . . where supply, production and research news is *made* . . . he brings you the facts which will enable you to act most profitably.

These days when you can't always get what you want when you want it, keep in touch with your Federated salesman for facts, for technical help that will assist you to do the best you can under the circumstances.

*Federated Metals Division*

AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.

Part of a Battery of DSM Vertical Core ovens. Note Sturdy Construction





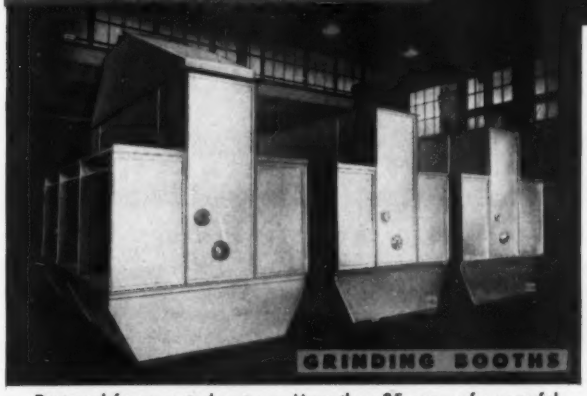
The double deck carrier on the roller conveyor has just been set down by the oven pendants. Another carrier is just coming down to be loaded. Loaded carriers are picked up at the opposite side by the fingers of the oven pendants.

**MEET US AT THE SHOW**
**ATLANTIC CITY**
**MAY 1st to 7th**
**BOOTH 1333**

# DSM

Industrial Engineers and Fabricators

established 1917




Dust and fume control systems. More than 35 years of successful experience in designing and installing. Dry and wet type collectors and washers for every air or gas cleaning requirement.

**PLANT ENGINEERING:** *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

**FORMED COWLINGS, PANELS, ETC.:** *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

**PILOT EQUIPMENT:** *Sample size equipment for development of heavy equipment.*

**INDUSTRIAL OVENS AND DRYERS • SPRAY BOOTHS • DUST COLLECTING AND FUME REMOVAL SYSTEMS • COMPLETE FINISHING SYSTEMS • RUST PROOFING AND SPRAY WASHING MACHINES • MOTOR CLEANING EQUIPMENT • VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS.**

# DETROIT SHEET METAL WORKS

**1311 OAKMAN BOULEVARD • DETROIT 6, MICHIGAN**

"ON THE RECORD"

# CRUCIBLE Melting

THE MODERN METHOD !

Three of the four oil-fired furnaces with No. 60 Crucibles, in the new quarters of Central Brass & Aluminum Company of St. Louis, Mo. Crucible capacity 200 lbs. brass of 60 lbs. aluminum. Note roll-back fume hoods and excellent housekeeping.

**Crucible melting belongs in the up-to-date, modernized non-ferrous foundry as shown in the illustration of an old-established company moved into new quarters.**

**Crucible melting completes the picture of overall efficiency and economy required to produce high quality castings in a highly competitive market.**

WRITE FOR CRUCIBLE MELTERS' HANDBOOK. MAILED FREE.

CRUCIBLES FOR FLEXIBILITY

CRUCIBLE MANUFACTURERS ASSOCIATION

40 EXCHANGE PLACE, NEW YORK 5, N. Y.

VISIT THESE BOOTHS AT ATLANTIC CITY AT THE 1952 CONVENTION MAY 1 to 7

JOSEPH DIXON CRUCIBLE CO.
Booth No. 1328

JOSEPH-TAGONY CRUCIBLE CO.
Booth No. 531

NAVA CRUCIBLE-REFRACTORIES COMPANY
Booth No. 418

VESUVIUS CRUCIBLE COMPANY
Booth No. 602

AMERICAN REFRACTORIES & CRUCIBLE CORPORATION
Booth No. 711

ELECTRO REFRACTORIES & ABRASIVES COMPANY
Booth No. 1435

# trends

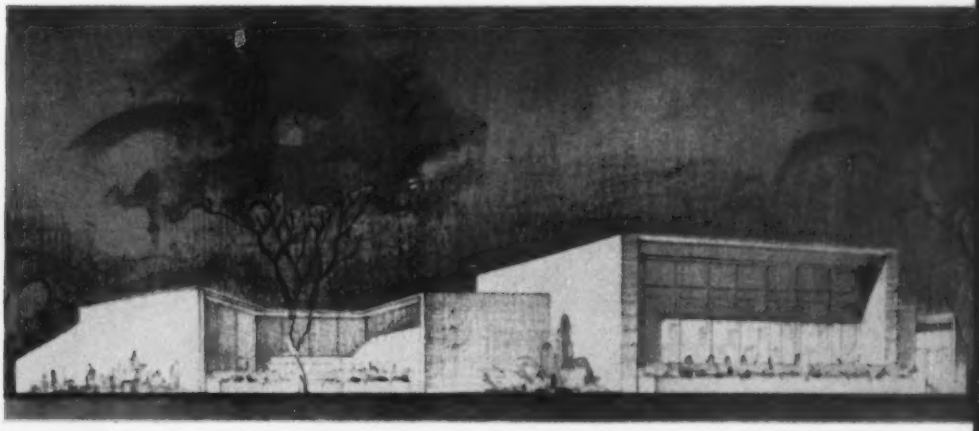
## Product and process developments...

■ What's new in foundry products, processes, and services will be better known after the 1952 A.F.S. Annual Convention and Foundry Show and International Foundry Congress, May 1-7, Atlantic City, N. J.

Several new fully automatic molding, core making, and core drawing machines will be shown. A unique, fully automatic sand tester will be unveiled. In materials handling, there is new equipment for handling hot, cold, metallic materials, and sand continuously and in batches.

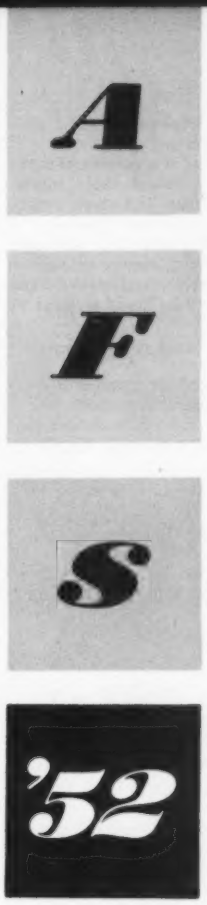
Shell molding will be represented by automatic equipment turning out molds at almost one a minute. New binders and release agents will be shown. Hundreds of other new wrinkles designed to help foundrymen produce more and better castings will be exhibited. Foundrymen can see them all, coupled with the staging of some 125 technical discussions at the industry's annual forum for exchange of information.

## How new A.F.S. Headquarters will look...



■ Sketch of new A.F.S. Headquarters building prepared by Charles W. Nicol & Associates, architect-engineers, Chicago. The firm was appointed by the A.F.S. Housing Committee to draw plans, prepared detailed specifications and invitations to bid, and supervise construction. Expected to be built in one of the Chicago suburbs, land for the building is under option subject to rezoning. The sketch shows one wing and the front of the U-shaped building which will be one story, brick and concrete, and as nearly fireproof as possible. Materials are being selected to achieve minimum repetitive maintenance costs. At this stage of planning, about 8,500 sq ft of floor space are contemplated.

# *International Foundry Congress & Show*




TECHNOLOGY PLUS TOOLS will be the theme of the 1952 International Foundry Congress & Show, when A.F.S. will be host to the world's foundrymen in Atlantic City the week of May 1 through 7.

Seven days of top technical programs will be combined with the gigantic biennial A.F.S. Foundry Show to make the 1952 International a must for "every Foundry in '52."

Technical program of the Congress, featuring the newest in foundry technology and operating methods presented by the world's outstanding foundrymen, will be closely scheduled by divisional interest. This will give the visiting foundryman an opportunity to attend those sessions of particular interest to him in the shortest possible time.

## Division schedules

Thus all non-ferrous sessions, shop courses, round table luncheons and related events are scheduled for the first three days. Pattern division events will be held on May 2 and 3; Malleable May 2, 3 and 5; Sand May 1 through 7; Education May 5 and 6; Gray Iron May 4, 5, 6 and 7; Steel May 5, 6 and 7; and General Interest Committee sessions May 2 through 6.

Each day of the week-long International Foundry Congress will have its own designation—Thursday, May 1 is "Defense Day;" Friday, May 2 "Chapter Day;" Saturday, May 3 "President's Day;" Sunday, May 4 "International Day;" Monday, May 5 "Management Day"; Tuesday, May 6 "Old Timers' Day;" Wednesday, May 7 "Exhibitors' Day."

Running concurrently throughout the entire Congress will be the giant Foundry Show, where the newest in foundry equipment, supplies and services will be displayed by more than 250 manufacturers on a single floor of the Atlantic City Auditorium, largest exhibition hall in the world.

Highlight Foundry Congress events of interest to all foundrymen will begin with a colorful Official Opening Ceremony at 11:45 a.m., Thursday, May 1. Friday's program will feature the Annual A.F.S. Chapter Officers and Directors' Dinner at 7:00 p.m.

Annual Business Meeting of the Society will be held at 9:30 a.m. May 3, when A.F.S. National President Walter L. Seelbach will give the annual *"State of the Society"* address, followed by presentation of awards to winners of the 1952 A.F.S. Apprentice Contest, and election of National Officers and Directors of the Society. Official representatives of many overseas technical associations will be present to take part in the program.

Immediately following the Annual Business Meeting, John S. Bugas, vice-president Industrial Relations, Ford Motor Co., Dearborn, Mich., will present the Charles Edgar Hoyt Annual Lecture, *"Frontiers in Industrial Relations."* Foundry Show exhibits will remain closed until noon to allow all foundrymen to attend these important events.

Also on Saturday's calendar of events is the Defense Production Luncheon (Non-Ferrous), when foundrymen will be given a chance to talk over their problems with top NPA officials.

## International banquet

Saturday evening the highlight social event of the foundry year will take place—the International Banquet. Program of the Banquet will include presentation of A.F.S. Gold Medal Awards and Honorary Life Memberships and the International Award of Honor. Climaxing the Banquet, for the first time, will be a full program of nationally known professional entertainment, instead of the traditional Banquet speaker.

Sunday, May 4, will be a free day at the Foundry Show for visiting foundrymen from the Chesapeake, Metropolitan and Philadelphia Chapter areas. Several International and A.F.S. committees will meet on Sunday. At 4:30 p.m. A.F.S. will be host to all overseas foundrymen attending the Congress at an International Reception, and at 7:00 p.m., the A.F.S. Canadian chapters will hold their dinner, an A.F.S. Convention tradition.

Monday's highlights will include the Defense Production Luncheon (Ferrous) and in the evening the annual A.F.S. Alumni Dinner. This year for the first time, because of the importance of the speaker to the foundry industry, the Alumni invite all foundrymen and their ladies to attend the dinner to hear speaker William J. Grede of Grede Foundries, Inc., Milwaukee, foundryman president of the National Association of Manufacturers.

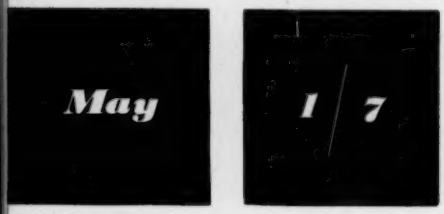
Tuesday's feature event will be the Equipment and Supplies Luncheon, when the industry's suppliers

will discuss developments and production problems.

The following is a resume of technical sessions, round table luncheons, shop courses and other events, grouped by divisional interest. A complete program of technical events, including names of session chairman, panelists and speakers and their topics will be found on page 96.

## Aluminum and magnesium

This Division's program will comprise four technical sessions and a round table luncheon, beginning May 1 and continuing through May 3.




First Aluminum & Magnesium session will be at 2:00 p.m., May 1, and will include papers dealing with aluminum casting defects, heat treatment of magnesium alloy castings and alloying Zn to Mg.

Session at 4:00 p.m. will cover investment casting of aluminum and practical applications of permeable metal casting plaster.

Friday, May 2, 10:00 a.m. session will have papers on mechanical properties of sand-cast Mg-Zn-Zr alloys, and zinc in aluminum casting.

Round table luncheon Friday noon will feature discussions of aluminum and magnesium casting problems.

Final Division session, at 3:00 p.m., Saturday, May 3, will feature premiere showing of the Aluminum & Magnesium research film *"Effect of Gating Design on Casting Quality."*

## Brass and bronze

Division's program will open May 1 with a round table luncheon, followed at 4:00 p.m. by the first of two Sand Shop Courses (Non-Ferrous) sponsored in conjunction with the Sand Division. Subject will be *"Synthetic vs. Naturally-Bonded Sands."* In the evening, the Non-Ferrous Founders' Society will hold its annual "Son-Father" Dinner.

First technical session will be at 10:00 a.m., Friday, May 2, and will deal with gating practices for bronze castings, and influence of aluminum on gun metal. Friday's 2:00 p.m. session will cover mold materials and fracture characteristics of copper-base alloys.

Friday, May 2, at 4:00 p.m. will be the second Sand Shop Course (Non-Ferrous), featuring a symposium on shell molding. Final Brass & Bronze technical session will be held at 3:00 p.m. on May 3 and will cover effect of lead and nickel on copper-base alloy grain sizes, and use of aluminum bronzes in high-pressure castings. Defense Production Luncheon on May 3 will be primarily for discussion of non-ferrous foundry problems with NPA officials.

## Pattern

The Division will have two technical sessions and a round table luncheon on May 2 and 3. First technical session will be at 10:00 a.m., May 2, and will cover core boxes, and patternmaking to compensate for shrink allowance. At noon the Pattern round table luncheon will deal with pattern apprentice training programs and new developments in metal patternmaking. Final Division session will take place at 2:00 p.m., Saturday, May 3, and will consist of talks on wood pattern construction and patterns for malleable and steel foundries.

## Malleable

Opening the Malleable technical program at 2:00 p.m. on Friday, May 2, will be a joint session with the Refractories Committee on *"Refractories as Applied to Malleable Duplexing and Batch-Type Air Furnaces."* Following this, at 4:00 p.m., will be a technical session dealing with tests for hot tears and with melting furnace atmosphere effects on fluidity and hot tears. The Division will recess until 10:00 a.m., Monday, May 5, when papers will be given on the effect of phosphorous on graphitization of black heart malleable, and on reducing malleable annealing time.

Concluding the Malleable program will be the Malleable round table luncheon at noon, May 5.

## Sand

Sand Division's program will be spread over the entire seven days of the Congress and includes five technical sessions and four shop courses, two of the latter held in conjunction with the Brass & Bronze Division.

Sand Shop Course (Non-Ferrous) will be the first event on the Division's program. To be held at 4:00 p.m. May 1 jointly with the Brass & Bronze Division, the session will be a discussion of *"Synthetic vs. Naturally Bonded Sands."*

Friday's 10:00 a.m. session will have three papers, dealing with olivine as a molding material and with bonding of sands. At 4:00 p.m., the second Sand Shop Course (Non-Ferrous), sponsored in conjunction with the Brass & Bronze Division, will deal with the timely subject of shell molding.

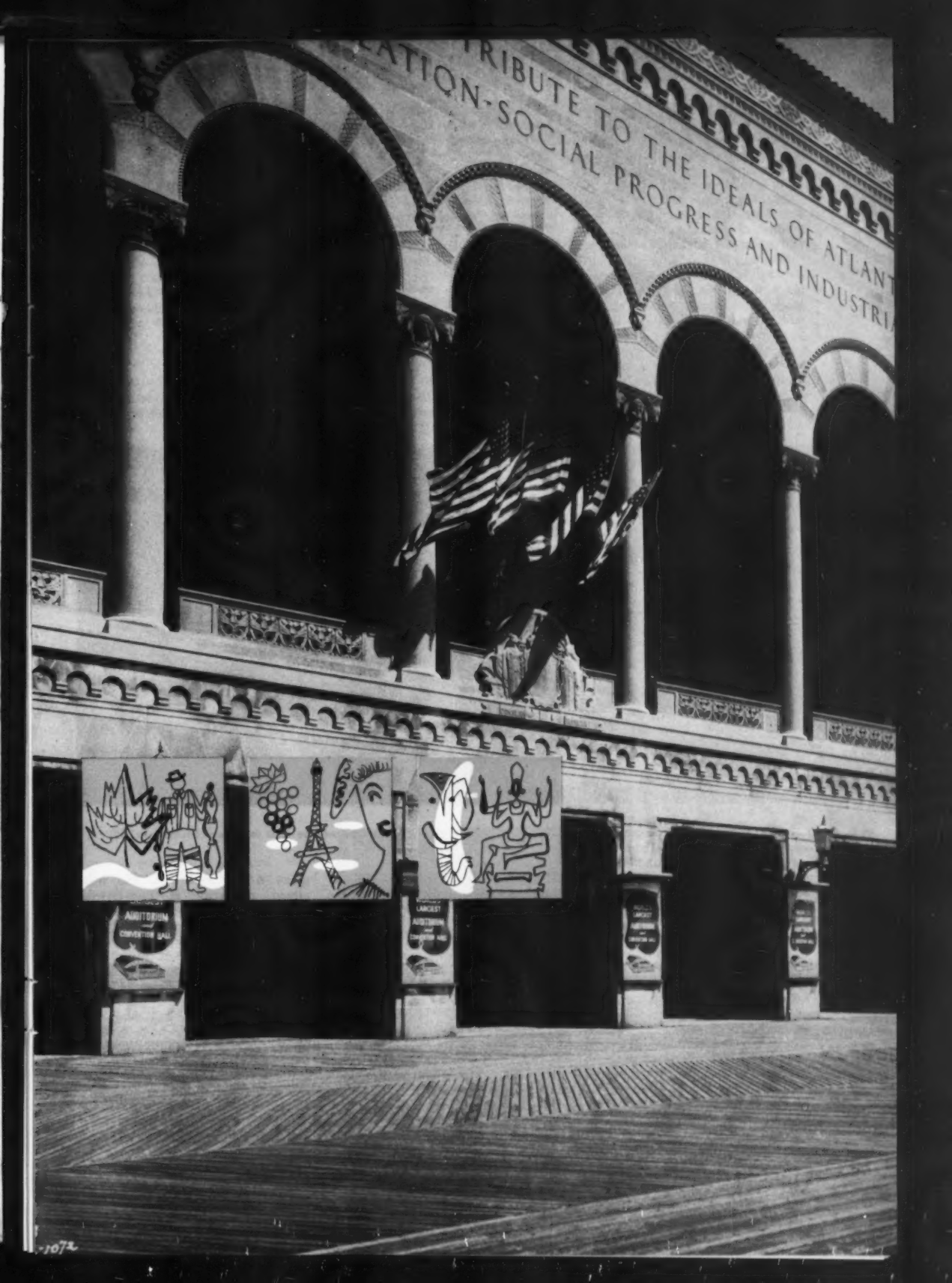
Saturday's 2:00 p.m. session will cover mineral perlite, influence of specimen tube loading and riddle size on molding sands, and a study of the A.F.S. fineness test.

Session at 4:00 p.m. Saturday, May 3, will have two papers on: influence of oven atmosphere on mold drying and core baking, and flowability of foundry sands.

Sessions will resume at 10:00 a.m. May 5, with talks on sand control, and on reclaiming foundry sands by pneumatic and air scrubbing methods.

Sand Shop Course at 4:00 p.m. May 5 will take up *"Use of High-Density Molding Materials in the Foundry."*

Sand Shop Course at 4:00 p.m. May 6 will have as its subject *"Household Hints and Tips."* Concluding Sand Division session, at 10:00 a.m., Wednesday, May 7, will cover veining of cores, steel sands at elevated temperatures, and effect of binders and additives on ductility.


TRIBUTE TO THE IDEALS OF ATLANT
CATION-SOCIAL PROGRESS AND INDUSTRI
AUDITORIUM
CONVENTION HALL
LARGEST
AUDITORIUM
CONVENTION HALL

## Gray iron

Nine technical sessions, two shop courses and a round table luncheon will comprise the program of the Gray Iron Division.

Opening session at 2:00 p.m., Sunday, May 4, will discuss a low-cost method of producing nodular iron; and production of nodular iron gears.

Monday, May 5, session at 10:00 a.m. will take up iron and steel melting in the cupola; and the metallurgical blast cupola. Session at 2:00 p.m., Monday, will deal with: the basic cupola, fluidity of cast iron; and influence of phosphorus on hot tear resistance. Gray Iron Shop Course, at 4:00 p.m. May 5, will be a discussion of the *"Mechanics of Tuyeres."*

Concluding day's program on May 7 will begin with a 10:00 a.m. session on *"Physical Properties of Spheroidal Graphite Cast Iron;" "A Solidification Dilatometer and Its Application to Gray Iron;"* and *"Influence of Some Residual Elements and Their Neutralization in Magnesium-Treated Nodular Iron."* Final technical session, at 2:00 p.m., will be on gases and blowholes, and on gating and risering.

## Education

Educational Division program will feature two sessions on *"Chapter Educational Activities,"* one at 2:00 p.m. and one at 4:00 p.m., Monday, May 5. Third and final Educational sessions, at 10:00 a.m. on Tuesday, May 6, will deal with two subjects: *"Management's Responsibility in the Training Program"* and *"Apprentice Training—It Is Needed."* Climaxing the Educational Program will be the International Educational Dinner at 6:30 p.m. on May 6, with Noel Newman and Tom Makemson, past president and secretary, respectively, of the Institute of British Foundrymen as speakers.

## Steel

Program opener will be a technical session at 10:00 a.m., Monday, May 5, dealing with substitution of boron for alloys in cast steel, and application of chills to increase feeding range and effectiveness of risers.

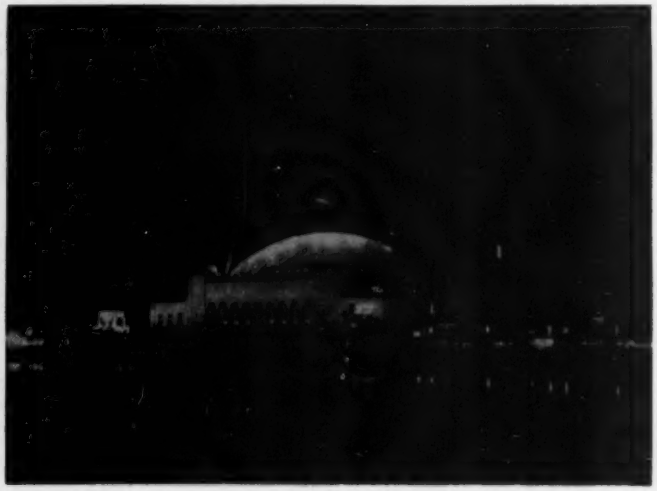
At 2:00 p.m., Monday, three papers will be presented on metallurgy and mechanics of hot tearing.

Tuesday, May 6, program will consist of 10:00 a.m. and 2:00 p.m. sessions on statistical quality control. Wednesday 10:00 a.m. session will be devoted to steel desulphurization with injected carbide, manufacture of cast steel edge tools, and cutting with high-purity oxygen. Climaxing the Steel Division's program will be its round table luncheon at noon Wednesday, May 7.

## General interest

New this year and of vital importance to the foundry industry will be three sessions on Safety & Hygiene & Air Pollution. The first, aimed primarily at non-ferrous foundrymen, will be held at 4:00 p.m., Saturday, May 3, and will cover *"Ventilation at Non-Ferrous Melting and Pouring Operations"* and *"How to Maintain Ventilating and Dust Collecting Systems."*

Second S & H & AP session, at 10:00 a.m., May 5, will deal with *"A.F.S. Safety & Hygiene & Air Pollution Program," "Air Pollution and the Foundry Industry,"* and *"Health Problems of the Metal Castings Industry."* Final session, at 2:00 p.m., Monday, will feature talks on *"Single Objective Foundry Safety"* and *"Air Pollution and the Cupola."*



**Atlantic City will be host to "Every Foundry in '52" . . .**

Simultaneously, a 4:00 p.m. technical session will be on commercial aspects of nodular iron and effects of cerium on graphite formation in alloy cast iron.

Tuesday's program will open with a technical session at 10:00 a.m. on: effect of sulphur on fluidity of gray iron, internal porosity, and effect of hydrogen on graphitization of iron.

Round table luncheon, Tuesday noon, May 6, will take up the subject of reclamation of castings. Gray Iron Shop Course at 4:00 p.m., Tuesday, will be devoted to *"Scrap Control by Sampling."* Simultaneous technical session will take up metallurgy of nodular iron. Also at 4:00 p.m. will be a joint session with the Refractories Committee on basic refractories for the cupola.

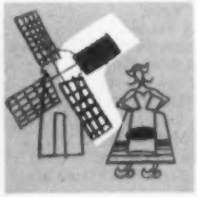
Refractories Committee will hold a joint session with the Malleable Division at 2:00 p.m., Friday, May 2, on *"Refractories as Applied to Malleable Duplexing and Batch-Type Air Furnaces."* Second Refractories session, at 2:00 p.m. on May 6, will be held jointly with the Gray Iron Division on *"Cupola Refractories."*

Timestudy & Methods Committee has a session scheduled at 10:00 a.m. Monday, May 5, on use of motion pictures for foundry motion and timestudy, and waste control; and a second session at 4:00 p.m. Monday on standards for rough chipping and removing welds, and melt department incentives.

Plant & Plant Equipment Committee program will consist of sessions

## Registration

Registration fee for the 1952 A.F.S. Foundry Congress & Show has been lowered markedly from that of the last Congress & Show (Cleveland, 1950). Fee will be $2.00 for A.F.S. members; and $5.00 for non-members. Registration will begin at 8:30 a.m., Thursday, May 1, and will continue throughout the entire Congress. Foundrymen of the Philadelphia, Chesapeake and Metropolitan Chapter areas will be admitted free of charge to the Foundry Show on Sunday, May 4, "International Day;" upon presentation of admission tickets distributed by the "International Day" Committees of the A.F.S. Chesapeake, Metropolitan and Philadelphia Chapters.



**. . . May 1 through 7**

at 2:00 p.m. and at 4:00 p.m., Monday, May 5, on various types of molding machines.

Foundry Cost Committee will present its first session at 4:00 p.m. on Monday, May 5, in the form of a question and answer panel. Its second session, at 10:00 a.m., Tuesday, will be on *"Pricing Castings Using Standard Costs."*

Heat Transfer Committee's first session will be at 10:00 a.m., May 6, on heat flow in moist sand, and solidification of nodular iron in sand molds. Second and final session, at 2:00 p.m., May 6, will cover riser treatments and the relationship of space, time and temperature in the casting of metals.

**Free world foundrymen will converge on Atlantic City's Auditorium May 1 through 7 to exchange knowledge and see new tools for the foundry.**

## Exhibit hours

The giant Foundry Show, located on a single floor of the Atlantic City Auditorium, world's largest, will be open the following hours: May 1, 9:30 a.m. to 5:30 p.m.; May 2, 9:00 a.m. to 9:30 p.m.; May 3, 12:00 noon to 5:30 p.m.; May 4, 10:00 a.m. to 6:30 p.m.; May 5, 9:00 a.m. to 5:30 p.m.; May 6, 9:00 a.m. to 5:30 p.m.; and May 7, 9:00 a.m. to 4:00 p.m. A list of the more than 250 foundry equipment manufacturers, suppliers and service organizations who will participate in the 1952 A.F.S. International Foundry Congress & Show will be found on the following pages.

# ▶Partial list of exhibitors

## 1952 A.F.S. International Foundry Congress & Show

Accurate Match Plate Co., Inc. ..... Chicago.
Adams Co. ..... Dubuque, Iowa.
Advance Glove Mfg. Co. ..... Detroit.
Aerodyne Development Corp. ..... Cleveland.
Air Reduction Sales Co. ..... New York.
Ajax Electrothermic Corp. ..... Trenton, N. J.
Ajax Engineering Corp. ..... Trenton, N. J.
Ajax Flexible Coupling Co., Inc. ..... Westfield, N. J.
Allis-Chalmers Mfg. Co. ..... Milwaukee.
Alloy Metal Abrasive Co. ..... Ann Arbor, Mich.
Alpha-Lux Co., Inc. ..... New York.
American Air Filter Co., Inc. ..... Louisville.
American Clay Forming Co. ..... Tiffin, Ohio.
American Colloid Co. ..... Chicago.
American Fire Clay & Products Co. ..... Canfield, Ohio.
American Gas Association ..... New York.
American Lava Corp. ..... Chattanooga.
American Metal Market ..... New York.
American Refractories & Crucible Corp. ..... North Haven, Conn.
American Silica Sand Co. ..... Ottawa, Ill.
American Steel Abrasive Co. ..... Galion, Ohio.
American Wheelabrator & Equipment Corp. ..... Mishawaka, Ind.
Apex Smelting Co. ..... Chicago.
Archer-Daniels-Midland Co. ..... Cleveland, Ohio.
Asbury Graphite Mills, Inc. ..... Asbury, N. J.
Atlas Plastic & Aluminum Plate Co. ..... Butler, Wis.
Ayers Mineral Co. ..... Zanesville, Ohio.

Bakelite Co. ..... New York.
Baroid Sales Div., National Lead Co. ..... Chicago
C. O. Bartlett & Snow Co. ..... Cleveland.
Bay State Abrasive Products Co. ..... Westboro, Mass.
Beardsley & Piper Div., Pettibone Mulliken Corp. ..... Chicago.
Black Sivalls & Bryson, Inc. ..... Kansas City, Mo.
Blaw-Knox Div. of Blaw-Knox Co. ..... Pittsburgh.
Bloomsbury Graphite Co. ..... Bloomsbury, N. J.
Borden Co.—Chemical Div. ..... New York.
Buckeye Tools Corp. ..... Dayton, Ohio.

Campbell-Hausfeld Co. ..... Harrison, Ohio.
Canton Chaplet & Mfg. Co. ..... Canton, Ohio.
Carborundum Co. ..... Niagara Falls, N. Y.
Chain Belt Co. ..... Milwaukee.
Chicago Pneumatic Tool Co. ..... New York.
Clearfield Machine Co. ..... Clearfield, Pa.
Cleco Div., Reed Roller Bit Co. ..... Houston, Tex.
Cleveland Flux Co. ..... Cleveland.
Cleveland Metal Abrasive Co. ..... Cleveland.
Cleveland Vibrator Co. ..... Cleveland.
Climax Molybdenum Co. ..... New York.
L. A. Cohn & Bro., Inc. ..... Chicago.
Colonial Smelting & Refining Co., Inc. ..... Columbia, Pa.
Combined Supply & Equipment Co. ..... Buffalo.
Connecticut Coke Co. ..... New Haven, Conn.
Corn Products Sales Co. ..... Columbia, Pa.
G. & W. H. Corson, Inc. ..... Plymouth Meeting, Pa.
Crane Co. ..... Chicago.

Davenport Machine & Foundry Co. ..... Davenport, Iowa.
Dayton Oil Co. ..... Dayton, Ohio.
Dehevoise-Anderson Co., Inc. ..... New York.
Delaware Tool Steel Corp. ..... Wilmington, Del.
Delta Oil Products Co. ..... Milwaukee.
Wm. Demmler & Bros. ..... Kewanee, Ill.
Despatch Oven Co. ..... Minneapolis
Detroit Electric Furnace Div., Kuhlman Electric Co. ..... Bay City, Mich.
Detroit Sheet Metal Works ..... Detroit.
DeWalt, Inc. ..... Lancaster, Pa.
Harry W. Dietert Co. ..... Detroit.
Dings Magnetic Separator Co. ..... Milwaukee.
Joseph Dixon Crucible Co. ..... Jersey City, N. J.
DoALL Co. ..... Des Plaines, Ill.
Dougherty Lumber Co. ..... Cleveland.
Dow Corning Corp. ..... Midland, Mich.
Durez Plastics & Chemicals, Inc. ..... North Tonawanda, N.Y.

Eastern Clay Products, Inc. ..... Jackson, Ohio.
Eastern Gas & Fuel Associates ..... Boston.
Eastman Kodak Co. ..... Rochester, N.Y.
Econocast, Inc. ..... Chattanooga.
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corp. ..... New York.
Electro Refractories & Abrasives Corp. ..... Buffalo.
Exomet, Inc. ..... Conneaut, Ohio.
Exothermic Alloys & Service, Inc. ..... Chicago

Fabreeka Products Co. ..... Boston.
Fanner Mfg. Co. ..... Cleveland.
Federal Foundry Supply Co. ..... Cleveland.
Federated Metals Div., American Smelting & Refining Co. ..... New York.
The Foundry, Penton Publishing Co. ..... Cleveland.
Foundry Educational Foundation ..... Cleveland.
Foundry Equipment Co. ..... Cleveland.
Foundry Equipment Mfrs. Association, Inc. ..... Cleveland.
Foundry Facings Manufacturers Assn. ..... Pittsburgh.
Fox Grinders, Inc. ..... Pittsburgh.
Foxboro Co. ..... Foxboro, Mass.
Freeman Supply Co. ..... Toledo, Ohio.
Fremont Flask Co. ..... Fremont, Ohio.

General Electric Co., Chemical Div. ..... Pittsfield, Mass.
General Electric Co., X-Ray Dept. ..... Milwaukee.
General Grinding Wheel Corp. ..... Philadelphia.
General Refractories Co. ..... Philadelphia.
Girdler Corp., Thermex Div. ..... Louisville.
Globe Steel Abrasive Co. ..... Mansfield, Ohio.
Gray Iron Founders' Society ..... Cleveland.
Great Lakes Carbon Corp. ..... St. Louis.
Great Lakes Foundry Sand Co. ..... Detroit.
Samuel Greenfield Co. ..... Buffalo.
Grindle Corp. ..... Markham, Ill.

Harbison-Walker Refractories Co. ..... Pittsburgh.
Harnischfeger Corp. ..... Milwaukee.
Benj. Harris & Co. ..... Chicago Heights, Ill.
Harrison Abrasive Div., Metals Disintegrating Co., Inc. ..... Manchester, N.H.
Harrison Machine Co. ..... Weslevville, Erie, Pa.
Hercules Powder Co. ..... Wilmington, Del.
Herman Pneumatic Machine Co. ..... Pittsburgh.
Hewitt-Robins, Inc. ..... New York.
Hickman, Williams & Co. ..... Philadelphia.
Hill & Griffith Co. ..... Cincinnati.
Hines Flask Co. ..... Cleveland.
Frank G. Hough Co. ..... Libertyville, Ill.
E. F. Houghton & Co. ..... Philadelphia.
Howard Foundry Co. ..... Chicago.
Hydro-Blast Corp. ..... Chicago.

Independent Pneumatic Tool Co. ..... Aurora, Ill.
Induction Heating Corp. ..... Brooklyn, N. Y.
Industrial Fabricating, Inc. ..... Eaton Rapids, Mich.
Industrial Minerals Co. ..... Lancaster, Ohio.

Ingersoll-Rand Co. ..... New York.
International Graphite & Electrode Corp. ..... St. Marys, Pa.
International Molding Machine Co. ..... LaGrange Park, Ill.
International Nickel Co., Inc. ..... New York.
Iron Age ..... New York.
Iron Lung Ventilator Co. ..... Cleveland.

Jarrel-Ash Co. ..... Boston, Mass.
Jeffrey Manufacturing Co. ..... Columbus, Ohio.
William F. Jobbins, Inc. ..... Aurora, Ill.
Johnson-March Corp. ..... Philadelphia.
Joy Manufacturing Co. ..... Pittsburgh.

Kelly-Koett Mfg. Co. ..... Covington, Ky.
Kindt-Collins Co. ..... Cleveland.
Andrew King ..... Narberth, Pa.
Lester B. Knight & Associates, Inc. ..... Chicago.
H. Kramer & Co. ..... Chicago.
Chas. A. Krause Milling Co. ..... Milwaukee.
Kwik-Mix Co. ..... Milwaukee.

Lava Crucible-Refractories Co. of Pittsburgh ..... Pittsburgh.
R. Lavin & Sons, Inc. ..... Chicago.
Leeco Products ..... Detroit.
Lindberg Engineering Co., Fisher Furnace Div. ..... Chicago.
Linde Air Products Co. ..... New York.
Link-Belt Co. ..... Chicago.

Macklin Co. ..... Jackson, Mich.
Macleod Co. ..... Cincinnati.
Magie Brothers ..... Chicago.
Manley Sand Co. ..... Rockton, Ill.
Martin Engineering Co. ..... Kewanee, Ill.
Master Pneumatic Tool Co., Inc. ..... Cleveland.
Mathews Conveyer Co. ..... Elwood City, Pa.
Mechanical Handling Systems, Inc. ..... Detroit.
Michigan Smelting & Refining Div. of Bohn Aluminum & Brass Corp. ..... Detroit.
Millward Alloys, Inc. ..... Lockport, N. Y.
Mine Safety Appliances Co. ..... Pittsburgh.
Modern Equipment Co. ..... Port Washington, Wis.
Monk Tool Co. ..... Geneva, Ill.
Monsanto Chemical Co. ..... St. Louis.
The Moulders' Friend ..... Dallas City, Ill.
Mullite Refractories Co. ..... Shelton, Conn.
Mystic Iron Works ..... Boston

Nassau Smelting & Refining Co., Inc. ..... Staten Island, N. Y.
National Carbon Co., A Division of Union Carbide & Carbon Corp. ..... New York.
National Crucible Co. ..... Philadelphia.
National Engineering Co. ..... Chicago.
National Foundry Association ..... Chicago.
National Pigment Co. ..... Philadelphia.
National Pulverizing Co. ..... Millville, N. J.
Newaygo Engineering Co. ..... Newaygo, Mich.
New England Coke Co. ..... Boston.
New Jersey Silica Sand Co. ..... Millville, N. J.
Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries ..... Buffalo.
Wm. H. Nicholls Co., Inc. ..... Richmond Hill, N. J.
Nichols Engineering & Research Corp. ..... New York.
Non-Ferrous Founders' Society ..... Chicago.
North American Smelting Co. ..... Wilmington, Del.
Norton Co. ..... Worcester, Mass.

S. Obermayer Co. ..... Chicago.
Ohio Crankshaft Co. ..... Cleveland.
Ohio Ferro-Alloys Corp. ..... Canton, Ohio.
Oliver Machinery Co. ..... Grand Rapids, Mich.
Osborn Manufacturing Co. ..... Cleveland.

Pangborn Corp. ..... Hagerstown, Md.
Pekay Machine & Engineering Co. ..... Chicago.
Peninsular Grinding Wheel Co. ..... Detroit.
Pennsylvania Foundry Supply & Sand Co. ..... Philadelphia.
Pennsylvania Glass Sand Corp. ..... Pittsburgh.
Pennsylvania Pulverizing Co. ..... Pittsburgh.
Penola Oil Co. ..... Detroit.
Penton Publishing Co. ..... Cleveland.
George F. Pettinos, Inc. ..... Philadelphia.
Philadelphia Coke Co. ..... Philadelphia.
Picker X-Ray Corp. ..... White Plains, N. Y.
Pittsburgh Crushed Steel Co. & Subsidiaries ..... Pittsburgh.
Pittsburgh Lectromelt Furnace Corp. ..... Pittsburgh.
Precision Grinding Wheel Co., Inc. ..... Philadelphia.
Pressure Match Plate Co., Inc. ..... Philadelphia.
Pyrometer Instrument Co., Inc. ..... Bergenfield, N. J.
Pyro Refractories Co. ..... Oak Hill, Ohio.

Ready-Power Co. ..... Detroit.
Reda Pump Co. ..... Bartlesville, Okla.
Redford Iron & Equipment Co. ..... Detroit.
W. G. Reichert Engineering Co. ..... Newark, N. J.
Republic Coal & Coke Co. ..... Chicago.
H. H. Robertson Co. ..... Pittsburgh.
Robinson Clay Products Co. ..... Akron, Ohio.
Ross-Tacony Crucible Co. ..... Philadelphia.
Royer Foundry & Machine Co. ..... Kingston, Pa.

Safety Clothing & Equipment Co. ..... Cleveland.
Safety First Shoe Co. ..... Holliston, Mass.
Safety-Sling Products Co. ..... Detroit.
George Sall Metals Co. ..... Philadelphia.
Claude B. Schneible Co. ..... Detroit.
A. Schrader's Son, Division of Scovill Mfg. Co. ..... Brooklyn, N. Y.
Schramm, Inc. ..... West Chester, Pa.
Scientific Cast Products Corp. ..... Cleveland.
Semet-Solvay Div., Allied Chemical & Dye Corp. ..... New York.
Severance Tool Industries, Inc. ..... Saginaw, Mich.
Simonds Abrasive Co. ..... Philadelphia.
Simplicity Engineering Co. ..... Durand, Mich.
Smith & Richardson Mfg. Co. ..... Geneva, Ill.
Smith Oil & Refining Co. ..... Rockford, Ill.
Solvay Sales Div., Allied Chemical & Dye Corp. ..... New York.
Spencer Turbine Co. ..... Hartford, Conn.
Spo, Inc. ..... Cleveland.
Springfield Facing Co. ..... Harrison, N. J.
Stamford Engineering Works ..... Stamford, Conn.
Standard Conveyor Co. ..... N. St. Paul, Minn.
Standard Electrical Tool Co. ..... Cincinnati.
Standard Horse Nail Corp. ..... New Brighton, Pa.
States Engineering Corp. ..... Ft. Wayne, Ind.
*Steel* ..... Cleveland.
Steel Shot & Grit Co., Inc. ..... Boston.
Steel Shot Producers, Inc. ..... Butler, Pa.
Sterling Wheelbarrow Co. ..... Milwaukee.
Frederic B. Stevens, Inc. ..... Detroit.
Stewart-Warner Corp., Alemite Div. ..... Chicago.
Sutter Products Co. ..... Dearborn, Mich.
Swan-Finch Oil Corp. ..... New York.

Tabor Manufacturing Co. ..... Philadelphia.
Taggart Brimfield Co. ..... Hammonton, N. J.
G. H. Tennant Co. ..... Minneapolis.
Thiem Products, Inc. ..... Milwaukee.
Tincher Products Co. ..... Sycamore, Ill.
Titanium Alloy Mfg. Div., National Lead Co. ..... New York.
Toledo Scale Co. ..... Toledo, Ohio.

United Oil Mfg. Co. ..... Erie, Pa.
U. S. Reduction Co. ..... East Chicago, Ind.
United States Graphite Co. ..... Saginaw, Mich.
United States Gypsum Co., Industrial Div. ..... Chicago.
United States Rubber Co., Mechanical Goods Div. ..... New York.

Vanadium Corp. of America ..... New York.
Vesuvius Crucible Co. ..... Pittsburgh.
Vonnegut Moulder Corp. ..... Indianapolis.

Westover Engineers—Nomad Foundry Equipment Div. ..... Milwaukee.
Whitehead Brothers Co. ..... New York.
White Pine Lumber Co. ..... Chicago.
Whiting Corp. ..... Harvey, Ill.

Zanesville Sand Co. ..... Zanesville, Ohio.

# gold medal awards

**Albert Portevin**

Joseph S. Seaman Gold Medal

*"For technical contributions over many years to the arts and sciences of the foundry industry."*

Professor Portevin, perhaps France's outstanding metallurgical engineer, is honorary director and past director of the Ecole Superieure de Fonderie, Paris. His researches in metallurgy and allied fields have earned him scores of high honors and offices in the metals world.

**Henton Morrogh**

Wm. H. McFadden Gold Medal

*"For outstanding work and development in the field of spheroidal cast iron."*

As senior research manager in charge of all research activities of the British Cast Iron Research Association, Mr. Morrogh, a pioneer in the development of spheroidal iron, was awarded the British Iron & Steel Institute Gold Medal in 1947 for his work in this field.

←

**Albert P. Gagnebin**

Peter L. Simpson Gold Medal
(Joint Award)

*"For outstanding work and development in the field of spheroidal cast iron."*

Mr. Gagnebin and his co-recipient, Keith D. Millis, have been actively concerned with the development of spheroidal cast iron in the Research and Development Division of International Nickel Co. Mr. Gagnebin has for 20 years conducted extensive research into the properties and industrial applications of a variety of ferrous metals.

**Keith D. Millis**

Peter L. Simpson Gold Medal
(Joint Award)

*"For outstanding work and development in the field of spheroidal cast iron."*

Like his co-recipient, A. P. Gagnebin, Mr. Millis has been actively engaged in the commercial development of spheroidal cast iron for the Development and Research Division of International Nickel Co. Mr. Millis has conducted extensive research into the properties and applications of both ferrous and non-ferrous metals for the foundry industry.

**Frank G. Steinebach**

John A. Penton Gold Medal

*"For outstanding contributions to the foundry industry and the Society."*

Mr. Steinebach, as editor of the *Foundry*, has for 28 years been active in the metal castings industry and the American Foundrymen's Society. Mr. Steinebach has served as Chief, Foundry Equipment and Supplies Unit, WPB; Chairman of the Foundry Industry Advisory Committee to the Munitions Board, and is today Secretary of the National Castings Council.

## *Honorary life memberships*

## *awards*

**William Gloster Mixer**

*"For a lifetime of service and application of engineering to the foundry."*

Mr. Mixer began his career as an apprentice in 1909 and at the time of his retirement 40 years later was foundry superintendent for Buick Motor Division, General Motors Corp. During this period, Mr. Mixer was responsible for many innovations in foundry engineering practices and techniques.

**Alexander I. Krynitski**

*"For a lifetime of fundamental research in the field of metal casting."*

Since coming to this country as an Imperial Russian Army Colonel in charge of a military ordnance mission, Mr. Krynitski has served his adopted country well as chief of the Bureau of Standards' Experimental Foundry, where he has made many valuable contributions to cast metals research.

**Walter L. Seelbach**

*"Upon completion of his present term as President of A.F.S."*

A.F.S. President Seelbach, acting as a good will ambassador from A.F.S. to the foundrymen of many lands, in large measure has been responsible for the success of the 1952 International Foundry Congress. In addition, President Seelbach has given freely of his own time to visit many chapter and regional meetings of the Society and inaugurated the industry-sponsored A.F.S. Safety & Hygiene & Air Pollution Program.

# Convention Speakers

Hoyt lecturer

*John S. Bugas*

Alumni dinner speaker

*William J. Grede*

■ Headline speakers at the 1952 A.F.S. International Foundry Congress will be the first foundryman ever elected president of the National Association of Manufacturers and one of America's top experts on industrial relations.

William J. Grede, president of Grede Foundries, Inc., Milwaukee, and of the National Association of Manufacturers, will address the Annual Dinner of the A.F.S. Alumni, who because of the importance of the speaker to the foundry industry and to U. S. industry as a whole, this year for the first time have invited all foundrymen to attend their Annual Dinner.

John S. Bugas, vice-president Industrial Relations, Ford Motor Co., Dearborn, Mich., and a member of the Board of Directors of that organization, will deliver the top technical address of the foundry year —the Charles Edgar Hoyt Annual Lecture—immediately following the Annual A.F.S. Business Meeting, Saturday morning, May 3. Mr. Bugas' topic will be *"Frontiers in Industrial Relations."*

Alumni Dinner Speaker William J. Grede has for many years been prominent in foundry and manufacturing circles and heads Grede Foundries, Inc., Milwaukee, an organization operating five foundries in Wisconsin and Upper Michigan.

A graduate of the University of Wisconsin, Mr. Grede served as an infantry lieutenant in World War I. Upon discharge from the Army he became assistant to the president of a Decatur, Ill., foundry, and shortly afterward purchased Liberty Foundry, Wauwatosa, Wis., destined to become the first link in the chain of five Grede Foundries, an organization that today employs some 1100 men and produces 35,000 tons of gray iron and steel castings annually.

Like his fellow speaker, John S. Bugas, Mr. Grede has long believed in sound employee relations and has instituted group life insurance and a pension plan for all employees of Grede Foundries.

Mr. Grede is a member of A.F.S., Gray Research Institute, Gray Iron Founders' Society, Steel Founders' Society of America, and American Society for Testing Materials. He is a director and past president of the Wisconsin Manufacturers' Association and has been active in the National Association of Manufacturers since 1946. He was elected the first foundryman president of that organization this year.

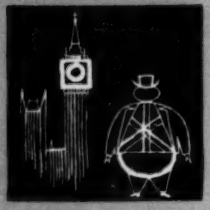
Hoyt Lecturer John S. Bugas is an honor law school graduate of the University of Wyoming and for a brief time practiced law in that state. In 1935 Mr. Bugas joined the FBI as a special agent, heading the Bureau's offices in such widely scattered cities as Juneau, Alaska; Birmingham, Ala., and Detroit.

Resigning from the FBI in 1944, Mr. Bugas was named director of Industrial Relations for Ford Motor Co. In 1946 he was appointed vice-president Industrial Relations, and in 1950 a member of Ford's Board of Directors.

In addition to his prominent position in the field of industrial relations, Mr. Bugas is active in many civic and industrial organizations.

# Convention program

## ....and program personalities



**Thursday**
*may 1*
**DEFENSE DAY**

**8:30 am**

**Registration begins**

**9:30 am**

**Exhibits open**

**Non-Ferrous Founders' Society meeting — members only**

**10:00 am**

**Ladies' registration begins**

**11:45 am**

**Official opening ceremony**

PRESIDING: C. V. Nass, Chairman, International Congress Committees.

**12:30 pm**

**Brass & Bronze Round Table Luncheon**

PRESIDING: B. A. Miller, Baldwin-Lima-Hamilton Corp., Philadelphia.

CO-CHAIRMAN: H. L. Smith, Federated Metals Div., American Smelting & Refining Co., Pittsburgh.

**Practical Problems—Take Your Pick**

C. L. Carter

C. B. Jenni

H. A. Schwartz

S. F. Carter

R. A. Clark

W. R. Jaeschke

F. W. Shipley

N. A. Kahn

J. M. Kane

R. A. Celton

R. P. Dunphy

H. H. Johnson

2:00 pm

**Aluminum & Magnesium**

PRESIDING: A. Cristello, American Light Alloys, Inc., Little Falls, N. Y.

CO-CHAIRMAN: A. T. Peters, Dow Chemical Co., Bay City, Mich.

(Preprint 52-12)
**Aluminum Casting Defects—Their Identification, Causes and Cures**
D. L. LaVelle, American Smelting & Refining Co., Barber, N. J.

(Preprint 52-51)
**Heat Treament of Magnesium Castings**
E. M. Gingerich, Aluminum Co. of America, Cleveland.

(Preprint 52-78)
**Alloying Zirconium to Magnesium**
W. P. Saunders and F. P. Strieter, Dow Chemical Co., Midland, Mich.

4:00 pm

**Aluminum & Magnesium**

PRESIDING: Hiram Brown, Solar Aircraft Co., Des Moines, Iowa

CO-CHAIRMAN: W. E. Sicha, Aluminum Co. of America, Cleveland.

(Preprint 52-39)
**Investment Casting of Aluminum**
H. Rosenthal and S. Lipson, Pitman-Dunn Labs., Frankford Arsenal, Philadelphia.

(Preprint 52-87)
**Some Practical Applications of Permeable Metal Casting Plaster**
R. F. Dalton, U. S. Gypsum Co., Chicago.

**Sand Shop Course—Non-Ferrous**

PRESIDING: W. B. Scott, American Brake Shoe Co., Meadville, Pa.

CO-CHAIRMAN: J. W. Clarke, General Electric Co., Erie, Pa.

**Synthetic vs. Naturally Bonded Sands**

DISCUSSION LEADERS: F. S. Brewster, Harry W. Dietert Co., Detroit; Clyde A. Sanders, American Colloid Co., Chicago; H. F. Taylor, MIT, Cambridge; H. H. Fairfield, Wm. Kennedy & Sons, Owen Sound, Ont., Canada.

5:30 pm

**Exhibits close**

7:00 pm

**Non-Ferrous Founders' Society—"Son-Father" Dinner**

## Friday * May 2
## CHAPTER DAY

9:00 am

**Registration opens**
**Exhibits open**

9:30 am

**Plant visitation groups depart by chartered buses**

10:00 am

**Aluminum & Magnesium**

PRESIDING: W. J. Klayer, Aluminum Industries, Inc., Cincinnati.

CO-CHAIRMAN: T. E. Kramer, Wm. F. Jobbins, Inc., Aurora, Ill.

(Preprint 52-86)
**Mechanical Properties of Sand Cast Magnesium-Zinc-Zirconium Alloys**
J. F. Hildebrand and F. P. Streiter, Dow Chemical Co., Midland, Mich.

(Preprint 52-44)
**High-Strength, Non-Heat Treated Aluminum Casting Alloys**
Walter Bonsack, Christiansen Corp., Chicago.

program

## 10:00 am

### Aluminum & Magnesium (Cont'd.)

(Preprint 52-38)
**Zinc in Aluminum Casting Alloys**
D. L. Colwell, Apex Smelting Co., Chicago.

### Brass & Bronze

PRESIDING: G. P. Halliwell, H. Kramer & Co., Chicago.

CO-CHAIRMAN: H. J. Roast, London, Ont.

(Preprint 52-67)
**Effects of Gating Practice on Leak Tightness of 85-5-5-5 and 81-3-7-9 Castings**
J. G. Kura, Battelle Memorial Institute, Columbus, and L. W. Eastwood, Kaiser Aluminum & Chemical Corp., Spokane.

(Preprint 52-70)
**Influence of Aluminum on Properties of Cast Gun-Metal and Removal of Aluminum by Slag**
OFFICIAL EXCHANGE PAPER FROM FOUNDRY SECTION, FEDERATION OF SWEDISH MECHANICAL ENGINEERING INDUSTRIES. A. V. Larsson, AB Svenska Metallverken, Vasteras.

### Sand

PRESIDING: C. C. Sigerfoos, Michigan State College, East Lansing, Mich.

CO-CHAIRMAN: V. M. Rowell, Archer-Daniels-Midland Co., Cleveland.

(In this issue)
**Practical Aspects of Olivine for Molding**
OFFICIAL EXCHANGE PAPER FROM THE NORWEGIAN FOUNDRYMEN'S ASSOCIATION. John Sissener and B. Langum, A/S Myrens Verkstad, Oslo, Norway.

(Preprint 52-80)
**Olivine Application in the Foundry**
G. S. Schaller, University of Washington.

**Mechanism of Bonding in Foundry Molding Sands**
L. M. Diran and H. F. Taylor, MIT.

### Pattern

PRESIDING: H. E. Lees, Whitin Machine Works, Whitinsville, Mass.

CO-CHAIRMAN: Vaughan C. Reid, City Pattern Foundry & Machine Co., Detroit.

(Preprint 52-7)
**Core Boxes from Core Plugs**
J. E. Mathias, Accurate Match Plate Co., Chicago.

(Preprint 52-36)
**Patternmaking to Compensate for Shrink Allowance**
M. K. Young, U. S. Gypsum Co., Chicago.

## 12:00 noon

### Aluminum & Magnesium Round Table Luncheon

PRESIDING: W. E. Sicha, Aluminum Co. of America, Cleveland.

**Sand Casting Practice for Aluminum and Magnesium Alloys**
DISCUSSION LEADERS: (Aluminum) T. D. Stay, Reynolds Metals Co., Cleveland. (Magnesium) C. C. Hitchcock, R. C. Hitchcock & Sons, Inc., Minneapolis.

### Pattern Round Table

PRESIDING: E. T. Kindt, Kindt-Collins Co., Cleveland.

CO-CHAIRMAN: A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee.

(Preprint 52-58)
**Pattern Apprentice Training Program**
F. W. Burgdorfer, Missouri Pattern Works, St. Louis.

**New Methods in Metal Patternmaking**
H. J. Jacobson, Industrial Pattern Works.

## 2:00 pm

### Brass & Bronze

PRESIDING: C. A. Robeck, Gibson & Kirk Co., Baltimore.

CO-CHAIRMAN: B. F. Shepard, Ingersoll-Rand Co., Phillipsburg, N. J.

(Preprint 52-55)
**Effects of Mold Materials on Leak Tightness and Mechanical Properties of 85-5-5-5 and 81-3-7-9 Alloy Castings**
J. G. Kura, Battelle Memorial Institute, Columbus, and L. W. Eastwood, Kaiser Aluminum & Chemical Corp., Spokane.

**Fracture Characteristics and Melt Quality of 85-5-5-5 Red Brass and Other Copper Alloys**
A.F.S. RESEARCH REPORT. Clarence Upthegrove, University of Michigan, and F. B. Rote, Albion Malleable Iron Co.

### Malleable & Refractories

PRESIDING: W. G. Ferrell, Auto Specialties Mfg. Co., St. Joseph, Mich.

CO-CHAIRMAN: Eric Welander, John Deere Malleable Works, East Moline, Ill.

(Preprint 52-24)
**Refractory Practice As Applied to Malleable Duplexing**
C. W. Meyer, Central Foundry Div., GMC, Saginaw, Mich.

(Preprint 52-27)
**Air Furnace Refractory Practice in Cupola-Air Furnace Duplexing**
W. C. Corbeau, National Malleable & Steel Castings Co., Cleveland.

(Preprint 52-95)
**Refractories Applied to Batch-Type Air Furnaces**
C. O. Schopp and P. F. Ulmer, Link-Belt Co., Indianapolis.

## 4:00 pm

### Sand Shop Course—Non-Ferrous

PRESIDING: R. H. Jacoby, Key Co., East St. Louis, Ill.

CO-CHAIRMAN: B. N. Ames, New York Naval Shipyard, Brooklyn.

**Symposium on Shell Molding**
DISCUSSION LEADERS: Vaughan C. Reid, City Pattern Foundry & Machine Co., Detroit; R. W. Crannell, Lehigh Foundries, Inc., Easton, Pa.; N. A. Kahn, New York Naval Shipyard, Brooklyn; E. N. Harrison, Econocast, Inc., Chattanooga; and H. K. Salzberg, Borden Co., N. Y.

## 6:30 pm

### Chapter Officers & Directors Dinner

PRESIDING: Walter L. Seelbach, A.F.S. National President.

## 9:30 pm

**Exhibits close**

## Saturday * May 3
## PRESIDENT'S DAY

## 9:00 am

**Registration opens**

## 9:30 am

### Annual A.F.S. Business Meeting

PRESIDING: Walter L. Seelbach, A.F.S. National President.

WELCOME TO INTERNATIONAL DELEGATES
PRESIDENT'S ANNUAL ADDRESS
APPRENTICE CONTEST AWARDS
ELECTION OF OFFICERS AND DIRECTORS

E. G. Tetzlaff

B. H. Booth

G. J. Barker

Dean Van Order

C. A. Robeck

H. J. Roast

H. F. Taylor

J. A. Rassenfoss

Victor Paschkis

H. W. Meyer

F. B. Rote

R. H. Olmsted

## 11:00 am

### Charles Edgar Hoyt Annual Lecture

**Frontiers in Industrial Relations**
John S. Bugas, Vice-President, Industrial Relations, Ford Motor Co., Dearborn, Mich.

## 12:00 noon

**Exhibits open**

**Defense Production Luncheon—Non-Ferrous**

PRESIDING: J. D. Zaiser, Ampco Metal, Inc., Milwaukee, President, Non-Ferrous Founders' Society; and L. H. Durdin, Dixie Bronze Co., Birmingham, Vice-President, Non-Ferrous Founders' Society.

## 2:00 pm

### Pattern

PRESIDING: V. J. Sedlon, Master Pattern Co., Cleveland.
CO-CHAIRMAN: H. C. Swanson, Arrow Pattern & Foundry, Chicago.

(In this issue)
**Practical Construction of Wood Patterns**
Walter Siebert, Elyria Foundry Division, Industrial Brown Hoist Co., Elyria, Ohio.

(Preprint 52-77)
**Patterns for Malleable and Steel Foundries**
J. M. Kreiner, National Malleable & Steel Castings Co., Cleveland.

### Sand

PRESIDING: H. J. Williams, New Jersey Silica Sand Co., Millville, N. J.
CO-CHAIRMAN: Stanton Walker, National Industrial Sand Association, Washington, D. C.

**A Study of the A.F.S. Fineness Test**
OFFICIAL EXCHANGE PAPER FROM THE INSTITUTE OF AUSTRALIAN FOUNDRYMEN (VICTORIAN DIVISION), H. A. Stephens, Commonwealth Scientific and Industrial Research Organization, Melbourne.

(Preprint 52-21)
**Mineral Perlite and Its Uses in the Foundry**
E. D. Boyle and H. R. Wolfer, Puget Sound Naval Shipyard, Bremerton, Wash.

(Preprint 52-26)
**Influence of Specimen Tube Loading and Riddle Size on Molding Sand Test Results**
D. I. Huizenga, Albion Malleable Iron Co., Albion, Mich., and K. E. Spray, U. S. Bureau of Ships, Washington, D. C.

**International Committee Meeting—Main Committee**

**International Committee Meeting—Foundry Dictionary**

## 3:00 pm

### Aluminum & Magnesium

PRESIDING: R. F. Thomson, General Motors Corp., Detroit.
CO-CHAIRMAN: T. D. Stay, Reynolds Metals Co., Cleveland.

**Effect of Gating Design on Casting Quality**
A.F.S. RESEARCH FILM.
K. Grube and J. H. Jackson, Battelle Memorial Institute, Columbus.

### Brass & Bronze

PRESIDING: William A. Mader, Oberdorfer Foundries, Inc., Syracuse, N. Y.
CO-CHAIRMAN: B. W. Schafer, Kuhlman Electric Co., Bay City, Mich.

(Preprint 52-88)
**Effect of Lead and Nickel on Grain Sizes of Certain Cast Copper-Base Alloys**
R. A. Colton, F. L. Turk and D. L. LaVelle, American Smelting & Refining Company, Barber, N. J.

(Preprint 52-54)
**Use of Aluminum Bronze in High-Pressure Castings**
T. C. Bunch and G. E. Dalbey, Mare Island Naval Shipyard, Vallejo, Calif.

(Preprint 52-92)
**Melting in High Speed Reverberatory Furnaces**
R. G. Carlson and W. B. Scott, National Bearing Div., American Brake Shoe Co., Meadville, Pa.

## 4:00 pm

### Malleable

PRESIDING: W. K. Bock, National Malleable & Steel Castings Co., Cleveland.
CO-CHAIRMAN: F. B. Rote, Albion Malleable Iron Co., Albion, Mich.

(Preprint 52-14)
**A Test for Hot Tearing Tendency**
A.F.S. RESEARCH REPORT. E. A. Lange and R. W. Heine, University of Wisconsin.

(Preprint 52-13)
**Effects of Melting Furnace Atmosphere on Fluidity, Hot Tearing Tendency and Other Properties of Malleable Iron**
A.F.S. RESEARCH REPORT. E. A. Lange and R. W. Heine, University of Wisconsin.

### Safety & Hygiene & Air Pollution

PRESIDING: A. L. Hunt, American Brake Shoe Co., St. Louis.
CO-CHAIRMAN: C. K. Faunt, Christensen & Olsen Foundry Co., Chicago.

(In this issue)
**Ventilation at Non-Ferrous Melting and Pouring Operations**
H. J. Weber, American Brake Shoe Co., Chicago.

(Preprint 52-93)
**How to Maintain Foundry Ventilation and Dust Collecting Systems**
K. M. Smith, Caterpillar Tractor Co., Peoria, Ill.

### Sand

PRESIDING: O. J. Myers, Foundry Products Div., Archer-Daniels-Midland Co., Minneapolis.
CO-CHAIRMAN: W. G. Parker, Elmira Foundry Co., Elmira, N. Y.

**Influence of Oven Atmosphere on the Drying of Molds and Baking of Cores**
G. Ulmer and M. deCrop, Centre Technique des Industries de la Fonderie, Paris.

(Preprint 52-60)
**Flowability of Foundry Sands**
L. M. Diran, A. J. Shaler, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge.

## 5:30 pm

**Exhibits close**

B. A. Miller

H. R. Williams

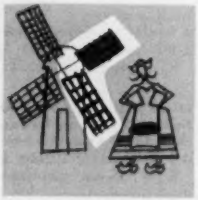
P. E. Kyle

A. T. Peters

R. E. Morey

W. K. Bock

program



### Gray Iron

PRESIDING: J. S. Vanick, International Nickel Co., New York.

CO-CHAIRMAN: G. T. Hassard, Farrell-Birmingham Co., Ansonia, Conn.

**A New Process for the Industrial Production of Nodular Iron with Low Treatment Costs**

OFFICIAL EXCHANGE PAPER FROM THE ITALIAN METALLURGICAL ASSOCIATION. Carlo Longaretti and Mario Noris, Institute for Siderurgy Finsider, Genoa.

**Production of Heavy Spheroidal Graphite Cast Iron Gears**

Corrado Galletto, Centro d'Informazione del Nickel, Milan, Italy.

**Gases and Naturally Occurring Blowholes in Foundry Practice.**

OFFICIAL EXCHANGE PAPER OF ASSOCIATION TECHNIQUE DE FONDERIE DE FRANCE. Albert Portevin, Institut de France, Paris.

CO-CHAIRMAN: R. A. Clark, Electro Metallurgical Div., Union Carbide & Carbon Corp., Detroit.

(Preprint 52-43)

**How Iron and Steel Melt in a Cupola**

H. W. Lownie, Jr., and C. T. Greenidge, Battelle Memorial Institute, Columbus, and D. E. Krause, Gray Iron Research Institute, Columbus.

(Preprint 52-48)

**Melting Iron in a Basic-lined, Water-cooled Cupola**

W. W. Levi, Lynchburg Foundry Co., Radford, Va.

(Preprint 52-76)

**Metallurgical Blast Cupola**

OFFICIAL EXCHANGE PAPER FROM THE BELGIAN FOUNDRY TECHNICAL ASSN., Robert Doat, Compagnie General des Conduites d'Eau, Liege, Belgium, and M. A. deBock, Consulting Engineer, Brussels, Belgium.

### Steel

PRESIDING: C. B. Jenni, General Steel Casting Corp., Eddystone, Pa.

F. P. Goettman

W. W. Levi

C. C. Sigerfoos

W. E. Sicha

R. H. Frank

H. H. Wilder

7:30 pm

**International Banquet**

PRESIDING: Walter L. Seelbach, National President, A.F.S.

PRESENTATION OF A.F.S. GOLD MEDAL AWARDS AND HONORARY LIFE MEMBERSHIPS

PRESENTATION OF INTERNATIONAL AWARD OF HONOR

ENTERTAINMENT

## Sunday * May 4
## INTERNATIONAL DAY

9:00 am

**Registration opens**

10:00 am

**Exhibits open**

**International committee meeting—Testing Cast Iron**

**A.F.S. committee meetings**

12:00 noon

**International Committee luncheon meeting—Foundry Defects**

2:00 pm

**International Committee of Foundry Technical Assns. meeting**

**A.F.S. committee meetings**

4:00 pm

**Ladies' musicale**

5:00 pm

**International reception**

6:30 pm

**Exhibits close**

7:00 pm

**President's dinner (By invitation)**

**Canadian dinner**

## Monday * May 5
## MANAGEMENT DAY

8:00 am

**National Castings Council Annual Meeting**

**Past Presidents' breakfast**

9:00 am

**Exhibits open**

**Registration opens**

10:00 am

**Gray Iron**

PRESIDING: J. D. Sheley, Black Clawson Co., Hamilton, Ohio.

CO-CHAIRMAN: D. Hall, Oklahoma Steel Casting Co., Tulsa, Okla.

(Preprint 52-45)

**The Substitution of Boron for Alloys in Cast Steel**

R. A. Dyke, Jr., and C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala.

(Preprint 52-66)

**Application of Chills to Increasing the Feeding Range of Risers**

E. T. Myskowski, H. F. Bishop, and W. S. Pellini, Naval Research Laboratory, Washington, D. C.

### Safety & Hygiene & Air Pollution

PRESIDING: F. W. Shipley, Caterpillar Tractor Co., Peoria, Ill.

CO-CHAIRMAN: J. R. Allen, International Harvester Co., Chicago.

**The A.F.S. Safety & Hygiene & Air Pollution Program**

J. R. Allen, Chairman, A.F.S. Safety & Hygiene & Air Pollution Committee—International Harvester Co., Chicago.

**Air Pollution and the Foundry Industry**

H. P. Munger, Battelle Memorial Institute, Columbus.

**Health Problems of the Metal Castings Industry**

D. A. Irwin, M. D., Aluminum Co. of America, Pittsburgh.

### Sand

PRESIDING: J. B. Caine, Wyoming, Ohio.

CO-CHAIRMAN: H. W. Dietert, Harry W. Dietert Co., Detroit.

H. W. Lownie

Hiram Brown

C. O. Burgess

C. E. Wenninger

C. K. Donoho

F. S. Brewster

(Preprint 52-42)
**Sand Control with Particular Reference to the Prevention of Scabbing**
OFFICIAL EXCHANGE PAPER FROM THE INSTITUTE OF BRITISH FOUNDRYMEN—W. B. Parkes, British Cast Iron Research Assn., England.

(Preprint 52-15)
**Pneumatic Reclamation for Foundry Sands**
C. E. Wenninger, National Engineering Co., Chicago.

(Preprint 52-47)
**Reclaiming Used Molding Sands by Air Scrubbing**
H. H. Fairfield, J. McConachie, and H. F. Graham, Wm. Kennedy & Sons Ltd., Owen Sound, Ont., Canada.

### Timestudy and Methods

PRESIDING: L. W. Lehman, John Deere Van Brunt Co., Horicon, Wis.

CO-CHAIRMAN: H. R. Williams, Williams Management Engineering, Milwaukee.

## 12:00 noon

### Malleable Round Table Luncheon

PRESIDING: James H. Lansing, Malleable Founders' Society, Cleveland.

CO-CHAIRMAN: Wm. A. Kennedy, Grinnell Co., Providence, R. I.

**Dielectric Core Baking**
DISCUSSION LEADERS: K. H. Hamblin, Grinnell Co., Providence, R. I., and P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill.

**Fluidity Tests**
DISCUSSION LEADER: P. C. Rosenthal, University of Wisconsin, Madison.

### Defense Production Luncheon Meeting—Ferrous

CO-CHAIRMEN: E. L. Roth, president, Gray Iron Founders' Society; C. C. Chambers, president, Malleable Founders' Society; H. A. Forsberg, president, Steel Founders' Society of America.

### Development and Application of Machines for the Making of Molds by Slinging

Martin Putz, Fairbanks Morse Co., Freeport, Ill.

### Safety & Hygiene & Air Pollution

PRESIDING: J. M. Kane, American Air Filter Co., Louisville.

CO-CHAIRMAN: F. A. Patty, General Motors Corp., Detroit.

**The Single Objective Approach to Foundry Safety**
Dan Farrell, United States Steel Co., Pittsburgh.

**Air Pollution and the Cupola**
J. Radcliffe, Ford Motor Co., Dearborn, Mich.

### Gray Iron

PRESIDING: J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham.

CO-CHAIRMAN: T. J. Wood, American Brake Shoe Co., Mahwah, N. J.

C. H. Wyman

W. H. White

R. F. Thomson

R. Schneidewind

H. Rosenthal

R. W. Gardner

**Use of Motion Pictures for Foundry Motion and Timestudy**
M. E. Mundel, Purdue University.

**Application of Motion Pictures for Motion and Timestudy in the Foundry**
M. T. Sell, Sterling Foundry Co., Wellington, Ohio.

(Preprint 52-53)
**Applied Waste Control Principles**
J. R. Walley, Helmick and Associates, Canton, Ohio.

### Malleable

PRESIDING: W. M. Albrecht, Chain Belt Co., Milwaukee.

CO-CHAIRMAN: P. F. Ulmer, Link-Belt Co.

(Preprint 52-8)
**Effect of Phosphorus Content on Graphitization Rate and Mechanical Properties of Black Heart Malleable Iron**
J. E. Rehder, Dept. of Mines & Technical Surveys, Ottawa, Ont., Canada.

(Preprint 52-41)
**Malleable Iron Annealing Time Reduced**
W. G. Wilson and N. F. Tisdale, Jr., Molybdenum Corp. of America.

### Foundry Educational Foundation Trustees Annual Meeting

## 2:00 pm

### Chapter educational activities

PRESIDING: F. G. Sefing, International Nickel Co., New York.

CO-CHAIRMAN: E. W. Horlebein, Gibson & Kirk Co., Baltimore.

SPEAKERS: Northwest Pennsylvania Chapter, E. M. Strick, Erie Malleable Iron Co., Erie, Pa.; Southern California Chapter, Robert Gregg, Reliance Regulator Div., American Meter Co., Alhambra, Calif.; Philadelphia Chapter, A. N. Kraft, Wilkening Mfg. Co., Philadelphia, and H. E. Mandel, Pennsylvania Foundry Supply and Sand Co., Philadelphia.

### Plant & Plant Equipment

PRESIDING: James Thomson, Continental Foundry & Machine Co., East Chicago, Ind.

CO-CHAIRMAN: R. J. Wolf, Stone & Webster Eng. Corp., Boston.

**Development and Application of Molding Machines for the Production of Light Castings**
A. S. Hedberg, Wells Mfg. Co., Skokie, Ill.

(Preprint 52-35)
**Production Experiences with a Basic Cupola**
S. F. Carter, American Cast Iron Pipe Co., Birmingham, Ala.

(Preprint 52-2)
**Factors Affecting Fluidity of Cast Iron**
L. F. Porter and P. C. Rosenthal, University of Wisconsin, Madison.

(Preprint 52-30)
**Influence of Phosphorus on Hot Tear Resistance of Plain and Alloy Gray Iron**
J. C. Hamaker, Jr., General Iron Works Co., Denver, and W. P. Wood, University of Michigan, Ann Arbor.

### Steel

PRESIDING: R. H. Jacoby, Key Co., East St. Louis, Ill.

CO-CHAIRMAN: R. H. Frank, Bonney-Floyd Co., Columbus.

(Preprint 52-65)
**Metallurgy and Mechanics of Hot Tearing**
H. F. Bishop, C. G. Ackerlind, and W. S. Pellini, Naval Research Laboratory, Washington, D. C.

(Preprint 52-82)
**Hot Tear Formation in Steel Castings**
U. K. Bhattacharya, C. M. Adams, and H. F. Taylor, MIT, Cambridge, Mass.

program

2:00 pm

**Steel (Cont'd.)**

(Preprint 52-90)

**Investigation of Hot Tears in Steel Castings**

A.F.S. Research Report. C. Wyman, Burnside Steel Foundry Co., Chicago; Gordon Johnson, Armour Research Foundation, Chicago; and G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind.

J. R. Walley

Wm. Zeunik

4:00 pm

**Gray Iron Shop Course**

Presiding: K. H. Priestley, Vassar Electroloy Products, Inc., Vassar, Mich.

Co-chairman: E. J. Burke, Hanna Furnace Corp., Buffalo, N. Y.

**Scrap Control by Sampling**

Discussion Leader: R. W. Gardner, Dearborn Iron Foundry, Ford Motor Co., Dearborn, Mich.

**Sand Shop Course**

Presiding: H. W. Meyer, General Steel Castings Corp., Granite City, Ill.

Co-chairman: F. S. Brewster, Harry W. Dietert Co., Detroit.

**Use of High Density Molding Materials in the Foundry**

Discussion Leader: W. M. Peterson, M. A. Bell Co., St. Louis.

**Chapter Educational Activities (Continuation of 2:00 pm session)**

**Foundry costs**

Presiding: R. L. Lee, Grede Foundries, Inc., Milwaukee.

Co-chairman: George Tisdale, Zenith Foundry Co., Milwaukee.

**Question and answer panel**

Discussion Leaders: C. S. Roberts, Dodge Steel Co., Philadelphia; C. E. Westover, Westover Engineers, Milwaukee; W. A. Gluntz, Gluntz Brass & Aluminum Foundry Co., Cleveland.

**Plant & Plant Equipment**

Presiding: James Thomson, Continental Foundry & Machine Co., East Chicago, Ind.

Co-chairman: H. W. Johnson, Wells Mfg. Co., Skokie, Ill.

**Jolt Rollover Molding Machines for Medium and Heavy Castings**

K. M. Smith, Caterpillar Tractor Co., Peoria, Ill.

**Special and Automatic Molding Machines**

K. M. Smith, Caterpillar Tractor Co., Peoria, Ill.

**Mechanization in Molding, Part II—motion picture**

H. C. Weimer, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago.

**Gray Iron**

Presiding: W. H. White, Jackson Iron & Steel Works, Jackson, Ohio.

Co-chairman: Carl Harmon, Hanna Furnace Corp., Buffalo.

C. H. Lorig

M. T. Sell

(Preprint 52-74)

**Commercial Experience with Higher Silicon Nodular Irons**

R. Schneidewind, University of Michigan, Ann Arbor, and H. H. Wilder, Vanadium Corp. of America, Detroit.

(Preprint 52-1)

**Effects of Cerium on Graphite Formation in Alloy Cast Iron**

E. A. Rowe, University of Washington, Seattle, and H. A. Johnson, Hanford Engineering Works, Richland, Wash.

5:30 pm

**Exhibits close**

7:15 pm

**Alumni Dinner**

(Open to all foundrymen and their ladies)

Presiding: W. L. Woody, National Malleable & Steel Castings Co., Cleveland.

Speaker: Wm. J. Grede, president, National Association of Manufacturers; and president, Grede Foundries, Inc., Milwaukee.

**Our Free Enterprise**

## Tuesday * May 6
### OLD TIMERS' DAY

9:00 am

**Registration opens**

**Exhibits open**

**Plant visitation groups depart by chartered buses**

10:00 am

**Foundry Costs**

Presiding: R. L. Lee, Grede Foundries, Inc., Milwaukee.

Co-chairman: M. E. Annich, American Brake Shoe Co., Mahwah, N. J.

(Preprint 52-84)

**Pricing Castings Using Standard Costs**

J. A. Westover, Westover Engineers, Milwaukee.

**Education**

Presiding: G. J. Barker, University of Wisconsin, Madison.

Co-chairman: W. J. Hebard, Continental Fdry. & Machine Co., East Chicago, Ind.

**Management's Responsibility in the Training Program**

J. D. Judge, Hamilton Foundry & Machine Co., Hamilton, Ohio.

(Preprint 52-17)

**Apprentice Training—It Is Needed**

M. C. Sandes, Mare Island Naval Shipyard, Vallejo, Calif.

O. J. Myers

N. A. Birch

**Gray Iron**

Presiding: F. T. McGuire, Deere & Co., Moline, Ill.

Co-chairman: W. A. Hambley, Chas. A. Krause Milling Co., Birmingham, Mich.

(Preprint 52-49)

**Effect of Sulphur on the Fluidity of Gray Cast Iron**

L. F. Porter and P. C. Rosenthal, University of Wisconsin, Madison.

(Preprint 52-23)

**Internal Porosity in Gray Iron Castings**

J. C. Hamaker, Jr., General Iron Works Co., Denver, W. P. Wood, University of Michigan, Ann Arbor, and F. B. Rote Albion Malleable Iron Co., Albion, Mich.

(Preprint 52-5)

**Effect of Hydrogen on Graphitization**

B. F. Brown, North Carolina State College, Raleigh, and M. F. Hawkes, Carnegie Institute of Technology, Pittsburgh.

J. S. Vanick

R. H. Jacoby

### Heat Transfer

PRESIDING: H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

CO-CHAIRMAN: E. C. Troy, Palmyra, N. J.

(Preprint 52-4)
**Heat Flow in Moist Sand**
A.F.S. RESEARCH REPORT. V. Paschkis, Columbia University, New York.

(Preprint 52-9)
**Solidification of Nodular Iron in Sand Molds**
R. P. Dunphy and W. S. Pellini, Naval Research Laboratory, Washington, D. C.

### Steel (Statistical Quality Control)

PRESIDING: H. H. Johnson, National Malleable & Steel Castings Co., Sharon, Pa.

CO-CHAIRMAN: R. W. Gardner, Dearborn Iron Foundry, Ford Motor Co., Dearborn, Mich.

(Preprint 52-16)
**The Whys and Wherefores of Statistical Quality Control**
W. R. Weaver, Republic Steel Corp., Cleveland.

(Preprint 52-34)
**Foundry Management Looks at Statistical Quality Control**
E. L. Fay, Deere & Co., Moline, Ill.

### National Foundry Association—Administrative Council Meeting

H. H. Fairfield

K. M. Smith

**Fundamentals of Foundry Refractories**
J. S. McDowell and J. D. Custer, Harbison-Walker Refractories Co., Pittsburgh.

(Preprint 52-72)
**Effect of Slag on Furnace Linings**
L. B. Wyckoff, Lewiston, N. Y.

### Steel (Statistical Quality Control)

PRESIDING: A. A. Evans, International Harvester Co., Indianapolis, Ind.

CO-CHAIRMAN: G. Ver Beke, John Deere Malleable Works, East Moline, Ill.

(Preprint 52-32)
**Quality Control in a Malleable Iron Foundry**
E. F. Price and O. K. Hunsaker Dayton Malleable Iron Co., Ironton, Ohio.

(In this issue)
**Quality Control in a Jobbing Steel Foundry**
H. H. Fairfield, Wm. Kennedy & Sons Ltd., Owen Sound, Ont., Canada.

### Timestudy & Methods

PRESIDING: J. E. Hyland, John Deere Spreader Works, East Moline, Ill.

CO-CHAIRMAN: C. J. Pruett, McWane Cast Iron Pipe Co., Birmingham, Ala.

(In this issue)
**Standards for Rough Chipping and Removing Welds**
Dean Van Order, Burnside Steel Foundry Co., Chicago.

G. E. Tisdale

L. W. Eastwood

## 4:00 pm

### Gray Iron

PRESIDING: J. E. Rehder, Department of Mines & Technical Surveys, Ottawa, Ont., Canada.

CO-CHAIRMAN: V. A. Crosby, Climax Molybdenum Co., Detroit.

(Preprint 52-28)
**Effect of Percentage of Nodular Graphite on Certain Mechanical Properties of Magnesium-Treated Cast Iron**
R. W. Lindsay, Pennsylvania State College, State College, and A. Shames, North American Aviation, Inc., Columbus, Ohio.

(Preprint 52-63)
**Time of Formation of Spherulites in Hypo- and Hyper-Eutectic Irons**
J. Keverian, C. M. Adams, Jr., and H. F. Taylor, Massachusetts Institute of Technology, Cambridge.

(Preprint 52-75)
**A Study of the Formation of Nodular Graphite**
Fredrik Hurum, Norway Institute of Technology, Trondheim, Norway.

### Gray Iron Shop Course

PRESIDING: W. W. Levi, Lynchburg Foundry Co., Radford, Va.

E. C. Zirzow

Samuel Lipson

## 12:00 noon

### Gray Iron Round Table Luncheon

PRESIDING: R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J.

CO-CHAIRMAN: C. O. Burgess, Gray Iron Founders' Society, Cleveland.

**Reclamation of Gray Iron Castings**

### Equipment & Supplies Luncheon

CO-CHAIRMAN: C. V. Nass, president, FEMA, and L. H. Heyl, president, FFMA.

## 2:00 pm

### Refractories

PRESIDING: R. H. Stone, Vesuvius Crucible Co., Swissvale, Pittsburgh.

CO-CHAIRMAN: W. R. Jaeschke, Whiting Corp., Harvey, Ill.

Victor Rowell

F. P. Strieter

(Preprint 52-50)
**A Melt Department Incentive Plan**
E. G. Tetzlaff, Pelton Steel Casting Co., Milwaukee.

### Heat Transfer

PRESIDING: H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

CO-CHAIRMAN: E. C. Troy, Palmyra, N. J.

(Preprint 52-81)
**A Simplified Analysis of Riser Treatments**
C. M. Adams, Jr., and H. F. Taylor, Massachusetts Institute of Technology, cambridge.

(Preprint 52-19)
**Space, Time, and Temperature Relations During Casting of Metals**
OFFICIAL EXCHANGE PAPER FROM THE NETHERLANDS FOUNDRYMEN'S ASSOCIATION. J. S. Abcouwer, Werkspoor, N.V., Utrecht.

J. B. Caine

E. W. Horlebein

CO-CHAIRMAN: E. J. Burke, Hanna Furnace Corp., Buffalo.

**Mechanics of Tuyeres**
DISCUSSION LEADERS: H. H. Wilder, Vanadium Corp. of America, Detroit, and Carl Harmon, Hanna Furnace Corp., Buffalo.

### Refractories and Gray Iron

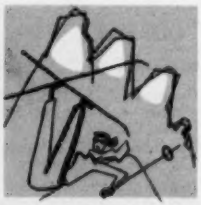
PRESIDING: R. A. Witschey, A. P. Green Fire Brick Co., Chicago.

CO-CHAIRMAN: S. F. Carter, American Cast Iron Pipe Co., Birmingham, Ala.

(Preprint 52-20)
**Basic Refractories for Cupola Service**
M. W. Demler, Harbison-Walker Refractories Co., Pittsburgh.

**Refractories for the Basic Cupola**
H. M. Kraner, Bethlehem Steel Co., Bethlehem, Pa.

program



5:30 pm

**Exhibits close**
**Registration closes**
**Ladies' registration closes**

7:00 pm

**International Education Dinner**

PRESIDING: I. R. Wagner, A.F.S. President Nominee, A.F.S., Electric Steel Castings Co., Indianapolis, Ind.

CO-CHAIRMAN: C. L. Carter, A.F.S. Vice-President Nominee, Albion Malleable Iron Co., Albion, Mich.

SPEAKERS: Noel P. Newman, Past President, Institute of British Foundrymen, Newman Hender & Co., Gloucester, England, and Tom Makemson, Secretary, Institute of British Foundrymen, Deansgate, Manchester, England.

(Preprint 52-56)

**A Solidification Dilatometer and Its Application to Gray Iron**

R. P. Dunphy and W. S. Pellini, Naval Research Laboratory, Washington, D. C.

**Physical Properties of Spheroidal Graphite Cast Iron**

C. C. Reynolds and H. F. Taylor, Massachusetts Institute of Technology.

**Sand**

PRESIDING: E. C. Zirzow, Werner G. Smith, Inc., Cleveland.

(Preprint 52-6)

**Veining Tendencies of Cores**

A.F.S. COMMITTEE REPORT. V. M. Rowell, Archer-Daniels-Midland Co., Cleveland.

**Steel Sands at Elevated Temperatures**

A.F.S. RESEARCH REPORT. R. G. Thorpe, A. E. Riccardo, P. L. Widener, and P. E. Kyle, Cornell University, Ithaca, N. Y.

H. L. Smith

Walter Bonsack

V. E. Zang

L. H. Hahn

C. A. Sanders

R. J. Wolf

4:00 pm (Cont'd.)

**Sand Shop Course**

PRESIDING: B. H. Booth, Carpenter Bros., Inc., Milwaukee.

CO-CHAIRMAN: R. H. Olmsted, Whitehead Bros. Co., New York.

**Household Hints and Tips**

PANEL MEMBERS: T. E. Barlow, Eastern Clay Products Dept., International Chemicals & Minerals Co., Jackson, Ohio.
C. Crawford, Frederic B. Stevens, Inc., Detroit.
Thomas W. Curry, Lynchburg Foundry Co., Lynchburg, Va.
R. L. McIlvaine, National Engineering Co., Chicago.
O. J. Myers, Archer-Daniels-Midland Co., Minneapolis.
C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago.
J. Owen, Harbison-Walker Refractories Co., Chicago.
J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind.
J. S. Schumacher, Hill & Griffith Co., Cincinnati.

**Wednesday * May 7**
**EXHIBITORS' DAY**

9:00 am

**Registration opens**

**Exhibits open**

10:00 am

**Gray Iron**

PRESIDING: A. P. Gagnebin, International Nickel Co., Bayonne, N. J.

CO-CHAIRMAN: R. Schneidewind, University of Michigan, Ann Arbor.

(Preprint 52-79)

**Influence of Some Residual Elements, and Their Neutralization, in Magnesium-Treated Nodular Iron**

H. Morrogh, British Cast Iron Research Association, Birmingham, England.

**Effect of Binders and Additives on Ductility in Molding Sands at Elevated Temperatures**

R. E. Morey, C. G. Ackerlind, and W. S Pellini, Naval Research Laboratory, Washington, D. C.

**Steel**

PRESIDING: C. H. Lorig, Battelle Memorial Institute, Columbus, Ohio.

CO-CHAIRMAN: C. Locke, Atlas Foundry & Machine Co., Tacoma, Wash.

(Preprint 52-29)

**Steel Desulphurization with Injected Carbide**

S. F. Carter, American Cast Iron Pipe Co. Birmingham, Ala.

(Preprint 52-57)

**Cutting with Ultra-High Purity Oxygen**

E. H. Roper and J. F. Kiernan, Air Reduction Sales Co., New York.

**Manufacture of Cast Edge Tools in Rotary Furnace Steel**

OFFICIAL EXCHANGE PAPER FROM INSTITUTE OF AUSTRALIAN FOUNDRYMEN (NEW SOUTH WALES DIV.). To be presented by title only.

J. A. Bowers

T. C. Bunch

G. P. Halliwell

Charles Locke

E. D. Boyle

W. S. Pellini

12:00 noon

**Steel Round Table Luncheon**

PRESIDING: J. B. Caine, Wyoming, Ohio.

CO-CHAIRMAN: V. E. Zang, Unitcast Corp., Toledo, Ohio.

**What Are Your Problems?**

**President's Luncheon for exhibitor officials (by invitation)**

2:00 pm

**Gray Iron**

PRESIDING: J. S. Vanick, International Nickel Co., New York.

CO-CHAIRMAN: T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa.

**Gating and Risering of Gray Iron**
A.F.S. RESEARCH REPORT. W. A. Schmidt and H. F. Taylor, Massachusetts Institute of Technology, Cambridge.

**Gating and Risering Terminology**
A.F.S. COMMITTEE REPORT. N. A. Birch, National Bearing Div., American Brake Shoe Co., Meadville, Pa.

3:00 pm

**Registration officially closes**

4:00 pm

**Exhibits officially close**

**INTERNATIONAL FOUNDRY CONGRESS ENDS**

## ▶ "Perseus" arrives in United States

**A distinguished "visitor" from overseas is this cast replica of Benvenuto Cellini's "Perseus," symbol of the International Award of Honor to be presented at the 1952 International Foundry Congress. Admiring the statue, which will remain in this country for a year, are from left: A.F.S. President Nominee I. R. Wagner, Technical Director S. C. Massari and Secretary-Treasurer Wm. W. Maloney.**

## ▶ A student chapter grows in Brooklyn

■ Formation of the 13th A.F.S. student chapter at the Polytechnic Institute of Brooklyn has been approved by the Society's Board of directors. Organized under the auspices of the Metropolitan Chapter, the new group will have as its faculty advisor William H. Ruten of the Institute, long-time member of the A.F.S. Educational Division and chairman of the Metropolitan Chapter's Educational Committee.

Industrial advisor for the student chapter is J. S. Vanick, International Nickel Co., New York, chairman of the Metropolitan Chapter.

Immediately on petitioning for chapter status, the BPI student group went into action with full participation in the Institute's Engineers Day program. The new chapter will also participate in the Student Delegate Plan which provides for each student chapter or FEF school to be represented at the International Foundry Congress by two delegates.

Officers of the BPI Student Chapter are: president, Emil Rogner; vice-president, Jerome Sadofsky; secretary, Richard Casagrande; and treasurer, Louis Honig. In addition, the following students signed the petition for recognition as a chapter: George Arkwright, Gerald Bennett, John Benson, E. Carcaci, Joseph Chodrow, Frank Kimpel, Franklin Leung, Seymour Levy, Walter Lewis, Ralph Mollerick, Per Naess, John Neesham, Stephen Pappas, Peter Paranicas, Andrew Schneider, Biagio Spinelli, and Robert Whalen.

The Metropolitan Chapter Educational Committee, which has an excellent record of cooperation with New York state educational institutions, includes, in addition to Chairman Ruten: William T. Maher, Barnett Foundry & Machine Co., Irvington, N. J.; Charles D. Preusch, Crucible Steel Co. of America, Harrison, N. J.; Robert R. Waltien, New York Naval Shipyard, Brooklyn; and Frederick R. Wiehl, Singer Mfg. Co., Elizabeth, N. J.

Student chapters are organized in accordance with an A.F.S. Board policy established in 1947 as a part of the Society's educational program. Close industrial contact is an important phase of student chapter operation and is maintained through an industrial advisor working with the faculty advisor and the students. Most student chapters are located in an area occupied by one or more regular chapters and the industrial advisor is often the chairman of the chapter's educational committee.

Regular chapters have been instrumental in aiding schools to obtain equipment and supplies. Some have established scholarships and student aid funds. Plant visitations play a large part in student chapter operations, along with talks by practicing foundrymen, and these are arranged largely through the cooperation of regular chapters. Other forms of cooperation include furnishing libraries of foundry literature, assisting schools to obtain better foundry teaching facilities, and acting in an advisory capacity in the improvement of curricula.

A.F.S. student chapters function at many of the FEF schools and at several other engineering colleges. Close cooperation exists between industry and educators in connection with the student chapters and activities of the Foundry Educational Foundation, the two programs supplementing each other.

# *Officers and Directors*

*President*
**Walter L. Seelbach**
Superior Foundry, Inc.
Cleveland

**L. C. Ferquhar, Sr.**

**T. E. Egan**

**L. D. Wright**

**V. J. Sedlon**

*Vice-President*
**I. R. Wagner**
Electric Steel Casting Co.
Indianapolis

**of the American Foundrymen's Society**

*Terms expire 1952*

**T. E. Eagan**
Cooper-Bessemer Corp., Grove City, Pa.

**L. C. Farquhar, Sr.**
American Steel Foundries, East St. Louis, Ill.

**V. J. Sedlon**
Master Pattern Co., Cleveland

**F. G. Sefing**
International Nickel Co., New York

**L. D. Wright**
U. S. Radiator Co., Geneva, N. Y.

**Walton L. Woody**
National Malleable & Steel Castings Co.

*Terms expire 1953*

**J. J. McFadyen**
Galt Malleable Iron Co., Galt, Ont.

**J. O. Ostergren**
Lakey Foundry & Machine Co., Muskegon, Mich.

**Frank W. Shipley**
Caterpillar Tractor Co., Peoria, Ill.

**James Thomsen**
Continental Fdy. & Machine Co., East Chicago

**E. C. Troy**
Palmyra, N. J.

*Terms expire 1954*

**Harry W. Dietert**
Harry W. Dietert Co., Detroit

**A. L. Hunt**
National Bearing Division, American Brake Shoe Co., St. Louis.

**James T. MacKenzie**
American Cast Iron Pipe Co., Birmingham

**Martin J. O'Brien, Jr.**
Symington-Gould Corp., Depew, N. Y.

**A. M. Ondreyco**
Oakland, Calif.

**F. G. Sefing**

**Walton L. Woody**

**E. C. Troy**

**Martin J. O'Brien, Jr.**

**Frank W. Shipley**

**J. J. McFadyen**

**J. O. Ostergren**

**James Thomsen**

**A. L. Hunt**

**A. M. Ondreyco**

**Harry W. Dietert**

**James T. MacKenzie**

...for

the

ladies

Mrs. W. L. Seelbach

Mrs. L. N. Shannon

Mrs. H. W. Dietert

Mrs. A. L. Hunt

Mrs. C. B. Shanley

Mrs. F. G. Steinebach

Mrs. R. C. S. Potter

Mrs. A. J. Tuscany

Mrs. H. J. Williams

Mrs. J. R. Wark

Mrs. A. A. Diebold

■ Springtime at the seashore provides an alluring prospect of pleasure and relaxation for ladies of the 1952 International Foundry Congress the week of May 1 through 7.

Supplementing the natural attractions of Atlantic City will be a full program of entertainment designed purely for the enjoyment of distaff members of the Congress.

## Tea and musicale

Headline events in the ladies' program will begin with the Annual A.F.S. Tea the afternoon of Friday, May 2, when ladies of the American foundry world will have an opportunity to meet those of Europe and many far-off lands. Tea chairman is Mrs. Harry W. Dietert of Detroit, assisted by Mrs. C. B. Shanley of St. Louis and Mrs. John R. Wark of Buffalo, co-chairmen.

Mrs. Walter L. Seelbach of Cleveland, "First Lady" of A.F.S., will pour, assisted by Mrs. L. N. Shannon of Birmingham, Ala., Mrs. I. Richards Wagner of Indianapolis, Mrs. Collins L. Carter of Albion, Mich., Mrs. C. V. Nass and Mrs. Wm. W. Maloney, both of Chicago.

A musicale is scheduled to provide a pleasant interlude of music and choral singing on Sunday afternoon, May 4. Feature attractions will be the Orpheus Singers and the Marlborough-Blenheim Concert Trio. Tea will be served following the musicale. Chairman for the event is Mrs. Frank G. Steinebach of Cleveland, assisted by Mrs. A. A. Diebold of Buffalo and Mrs. A. J. Tuscany of Cleveland.

## Fashion Show

Top event of the Congress from the feminine viewpoint will be the International Luncheon and Fashion Show beginning at 12:30 p.m. on Monday, May 5. Atlantic City's famed Boardwalk shops will show newest creations in gowns, hats and accessories.

Commentator Marie McCullough, official Atlantic City hostess, will be assisted by models from the Atlantic City Models Guild, and by the Bill Madden Trio and Singer Joe Thompson. Mrs. R. C. S. Potter of Buffalo is chairman of the event, aided by Mrs. H. W. Williams of Philadelphia and Mrs. Albert L. Hunt of St. Louis.

## Optional events

Optional events for Congress ladies include attendance at the Congress Opening Ceremony, May 1; Annual Business Meeting of A.F.S., May 3; Annual Banquet, May 3; and Alumni Dinner, May 5. Overseas visitors are invited to the International Reception, May 4. All ladies of the Congress are invited to inspect the Foundry Show as guests of A.F.S.

### Honorary Chairman

Mrs. Walter L. Seelbach

### Honorary Vice-Chairman

Mrs. L. N. Shannon

### Committee

Mrs. A. A. Diebold
Mrs. H. W. Dietert
Mrs. A. L. Hunt
Mrs. R. C. S. Potter
Mrs. C. B. Shanley
Mrs. F. G. Steinebach
Mrs. A. J. Tuscany
Mrs. J. R. Wark
Mrs. H. J. Williams
Mrs. Wm. W. Maloney
Mrs. S. C. Massari

### Honorary Committee

Mrs. Collins L. Carter
Mrs. C. R. Culling
Mrs. E. C. Hoenicke
Mrs. C. V. Nass
Mrs. I. R. Wagner

### Honorary Hostesses

Mrs. Walton L. Woody
Mrs. E. W. Herlebein
Mrs. W. B. Wallis
Mrs. Max Kunianshy
Mrs. S. V. Wood
Mrs. Fred J. Walls
Mrs. R. J. Teeter
Mrs. Lee C. Wilson
Mrs. D. P. Forbes
Mrs. H. S. Simpson
Mrs. H. S. Washburn
Mrs. Marshall Post
Mrs. H. Bornstein
Mrs. Jas. L. Wick, Jr.
Mrs. D. M. Avey
Mrs. T. S. Hammond
Mrs. E. H. Ballard
Mrs. N. K. B. Patch
Mrs. Fred Erb
Mrs. S. Wells Utley
Mrs. A. B. Root, Jr.
Mrs. L. W. Olson
Mrs. G. H. Clamer
Mrs. W. R. Bean
Mrs. C. S. Koch
Mrs. R. A. Bull
Mrs. Wm. H. McFadden

← International Luncheon and Fashion Show the afternoon of May 5 will be a highlight of the 1952 International Foundry Congress ladies' program.

# *International Foundry Congress*

## *hosts*

W. L. Seelbach

I. R. Wagner

**Walter L. Seelbach**
President
American Foundrymen's Society

**I. R. Wagner**
Vice-President
American Foundrymen's Society

**C. V. Nass**
Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago.
President
National Castings Council
Foundry Equipment Manufacturers Association

**L. N. Shannon**
Stockham Valves & Fittings, Inc., Birmingham, Ala.
President
International Committee of Foundry Technical Associations

### International Day Host Committees

**Chesapeake Chapter:** W. O. Becker, Atlantic Abrasive Corp.; J. B. Mentzer, Wood Embly Brass Co.; M. W. Danco, National Bearing Div., American Brake Shoe Co.

**Metropolitan Chapter:** Chairman Howard Voit, Sterling Wheelbarrow Co.; Vice-Chairman R. V. Hunter, Archer-Daniels-Midland Co.; Daniel J. Jones, New Jersey Silica Sand Co.; F. B. Eliason, Pennsylvania Foundry Supply & Sand Co.; A. E. St. John, Apro Alloys Co.; W. C. Russell, Eastern Foundry Supply Co.

**Philadelphia Chapter:** Chairman George H. Bradshaw, Philadelphia Naval Shipyard; J. L. Furey, Taggart Brimfield Co.; H. R. Williams, Geo. F. Pettinos Co.; Robert M. Carrigan, North American Smelting Co.; and J. Finnegan, Colonial Smelting & Refining Co.

### Reception Committee

**(Made up of chairmen and vice-chairmen of the 40 A.F.S. chapters)**

**Birmingham District:** Chairman C. K. Donoho, American Cast Iron Pipe Co., and Vice-Chairman Fred K. Brown, Adams, Rowe & Norman, Inc.

**British Columbia:** Chairman W. M. Armstrong, University of British Columbia, and Vice-Chairman Herbert Heaton, Leeston & Burpee, Ltd.

**Canton District:** Chairman C. B. Williams, Massillon Steel Castings Co., and Vice-Chairman Alexander Prentice, Stark Foundry Co.

**Central Illinois:** Chairman R. E. Dickison, Brass Foundry Co., and Vice-Chairman George Rockwell, Caterpillar Tractor Co.

**Central Indiana:** Chairman Robert Spurgin, III, Swayne Robinson Co., and Vice-Chairman C. O. Schopp, Link-Belt Co.

**Central Michigan:** Chairman Thomas T. Lloyd, Albion Malleable Iron Co., and Vice-Chairman Austen J. Smith, Michigan State College.

**Central New York:** Chairman Wm. D. Dunn, Oberdorfer Foundries, Inc., and Vice-Chairman D. J. Merwin, Oriskany Malleable Iron Co.

**Central Ohio:** Chairman William T. Bland, Commercial Steel Castings Co., and Vice-Chairman E. M. Durstine, Keener Sand & Clay Co.

**Chesapeake:** Chairman A. S. Kittrell, Leach Pattern Shop, and Vice-Chairman C. D. Galloway, Chambersburg Engineering Co.

**Chicago:** Chairman W. W. Moore, Burnside Steel Foundry Co., and Vice-Chairman John H. Owen, Harbison-Walker Refractories Co.

**Cincinnati District:** Chairman A. W. Schneble, Jr., Advance Foundry Co., and Vice-Chairman Burt A. Genthe, S. Obermayer Co.

**Detroit:** Chairman Vaughan C. Reid, City Pattern Foundry & Machine Co., and Vice-Chairman Michael Warchol, Atlas Foundry Co.

**Northern California:** President Philip C. Rodger, General Metals Corp., and Vice-President G. W. Stewart, East Bay Brass Foundry.

**Northern Illinois - Southern Wisconsin:** Chairman Carl L. Dahlquist, Greenlee Bros., and Vice-Chairman Jack Rundquist, Beloit Casting Company.

**Northwestern Pennsylvania:** Chairman J. D. James, Cooper-Bessemer Corp., and Vice-Chairman Fred J. S. Carlson, Weil-McLain Co.

**Saginaw Valley:** Chairman A. E. Edwards, Chevrolet Grey Iron Foundry, GMC, and Vice-Chairman K. H. Priestley, Vassar Electroloy Products, Inc.

**St. Louis District:** Chairman Ralph M. Hill, East St. Louis Castings Co., and Vice-Chairman H. W. Meyer, General Steel Castings Corp.

**Southern California:** Chairman H. W. Howell, Howell Foundry Co., and Vice-Chairman C. H. Pagenkopp, Angelus Pattern Works.

**Tennessee:** Chairman Porter Warner, Jr., Porter Warner Industries, and V-C. W. M. Hamilton, Crane Co.

**Texas:** Chairman John M. Bird, American Brass Foundry, and Vice-Chairman P. B. Croom, Houston Pattern Works.

**Timberline:** Chairman C. C. Drake, Griffin Wheel Co., and V-C. J. E. Schmuck, Rotary Steel Casting Co.

**Toledo:** Chairman J. A. Mescher, Unitcast Corp., and Vice-Chairman J. G. Blake, Alloy Founders.

**Tri-State:** Chairman Dan A. Mitchell, Progressive Brass Mfg. Co., and V-C. C. C. Beagle, Webb Corp.

**Twin City:** Chairman J. Fred Quest, J. F. Quest Foundry Co., and Vice-Chairman J. W. Costello, American Hoist & Derrick Co.

**Washington:** Chairman James D. Tracy, Salmon Bay Foundry Co., and Vice-Chairman W. L. Mackey, Washington Stove Works.

**Western Michigan:** Chairman R. P. Shaffer, Lakey Foundry & Machine Co., and Vice-Chairman William J. Cannon, Nugent Sand Co.

**Western New York:** Chairman Erwin Deutschlander, Worthington Pump & Machinery Corp., and V-C. Carl A. Harmon, Hanna Furnace Corp.

**Wisconsin:** President George E. Tisdale, Zenith Foundry Co., and Vice-President J. G. Risney, Risney Foundry Equipment Co.

C. V. Nass

L. N. Shannon

**Eastern Canada:** Chairman W. Turney Shute, Canadian Car & Foundry Co., and Vice-Chairman A. J. Moore, Montreal Bronze, Ltd.

**Eastern New York:** Chairman John E. Waugh, General Electric Co., and Vice-Chairman Leigh M. Townley, Adirondack Foundries & Steel, Inc.

**Metropolitan:** Chairman James S. Vanick, International Nickel Co.

**Mexico City:** Chairman N. S. Covacevich, La Consolidada, S.A., and Vice-Chairman Juan Latapi Sarre, Fundiciones de Hierro y Acero.

**Michiana:** Chairman S. F. Krzeszewski, American Wheelabrator & Equipment Corp., and Vice-Chairman Andrew Peterson, Oliver Corp.

**Mo-Kan:** Chairman E. C. Austin, Jr., National Aluminum & Brass Foundry, and Vice-Chairman John F. Redman, Jr., Redman Pattern Works.

**Northeastern Ohio:** President G. J. Nock, Nock Fire Brick Co., and Vice-President F. C. Cech, Cleveland Trade School.

**Ontario:** Chairman R. H. Williams, Canadian Westinghouse Co., Ltd., and Vice-Chairman Andrew Reyburn, Cockshutt Plow Co.

**Oregon:** Chairman E. J. Hyche, Rich Mfg. Co., and Vice-Chairman W. M. Halverson, Electric Steel Fdry. Co.

**Philadelphia:** Chairman George Bradshaw, Philadelphia Naval Shipyard, and Vice-Chairman Arnold N. Kraft, Wilkening Mfg. Co.

**Quad City:** Chairman W. C. Bell, Frank Foundries Corp., and Vice-Chairman Boyd L. Hays, Union Malleable Iron Works.

**Rochester:** Chairman Charles E. Vaughn, Ritter Co., and Vice-Chairman Leon C. Kimpal, Rochester Gas & Electric Corp.

W. L. Seelbach

J. H. Price

C. V. Nass, *President*

A. V. Martens, *Vice-President*

L. H. Heyl

E. L. Roth

C. C. Chambers

J. D. Zaiser

H. A. Forsberg

# National Castings Council

F. G. Steinebach, Secy.

F. R. Fleig, Treas.

NCC

Officers

**Working quietly on activities directly affecting the individual foundryman, but likely to be considered by him as somewhat remote, is the National Castings Council. It's time the NCC approach to its objectives was reported.**

■ Objects of the Council, according to the By-Laws, are "to provide a medium for cooperative action among the various associations, societies, and institutes serving the foundry industry on matters of mutual interest which are beyond the scope of the individual societies, or which can be performed better by collective action."

How the National Castings Council operates is illustrated by the Safety & Hygiene & Air Pollution Program currently conducted by A.F.S. on behalf of the foundry industry. Considering the problem at its meetings, the Council—the national president and another representative of each of nine foundry organizations — concluded that safety, hygiene, and air pollution could best be handled by the industry's technical society and requested A.F.S. to develop an overall, long-range program. With the program underway, solicitation of funds was initiated by each of the NCC-member organizations. The final solicitation will be by A.F.S.

The story of the National Castings Council begins in the early part of World War II when a number of foundrymen recognized the need for cooperative effort in representing the industry in Washington, D.C. Failure of the industry to present a united front resulted in the government getting a variety of impressions which hampered proper recognition of the industry's place in the war effort. As a result, the war effort and the industry suffered.

Initial talks leading toward the formation of NCC were held in 1941 and early in 1942. Finally a committee went to Washington to speak for the foundry industry but the effort was fruitless.

Following the war, efforts to organize a council of foundry groups were started in 1946 and on August 14 of that year an organization meeting was held. The following, representing the organizations indicated, were present: Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Pittsburgh, Foundry Equipment Manufacturers' Association; F. Ray Fleig, Smith Facing & Supply Co., Cleveland, Foundry Facing Manufacturers' Association; S. V. Wood, Minneapolis Electric Steel Casting Co., Minneapolis, American Foundrymen's Society; H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N.J., Gray Iron Founders' Society; Frank E. Shumann, Lehigh Foundries Inc., Easton, Pa., Malleable Founders' Society; T. S. Hemingway, Metal & Alloy Specialties Co., Buffalo, Non-Ferrous Founders' Society; H. O. Menck, Harnischfeger Corp., Milwaukee, National Foundry Association; and E. D. Flintermann, Michigan Steel Casting Co., Detroit, Steel Founders' Society of America. Mr. Menck was the first chairman.

The first regular election of officers was held January 15, 1948, with the following results: *president*, Howard A. Stockwell, Barbour Stockwell Co., Cambridge, Mass., president, Gray Iron Founders' Society; *vice-president*, Otto A. Pfaff, American Wheelabrator & Equipment Corp., Mishawaka, Ind., president, Foundry Equipment Manufacturers' Association; *secretary*, Frank G. Steinebach, editor, *Foundry*, Cleveland, and *treasurer*, F. Ray Fleig.

Subsequent NCC presidents have been: Otto A. Pfaff; Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., president, Malleable Founders' Society; Edwin W. Horlebein, Gibson & Kirk Co., Baltimore, Md., president, American Foundrymen's Society; and this year's president, C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, president, Foundry Equipment Manufacturers' Association. Other current officers include: vice-president, A. V. Martens, Pekin Foundry & Manufacturing Co., Pekin, Ill., president, National Foundry Association; secretary, Frank G. Steinebach; and treasurer, F. Ray Fleig.

## Nine NCC members

Though organized by eight foundry groups, the members of NCC now number nine since the inclusion of the Foundry Educational Foundation on February 2, 1951. The membership now includes the following organizations represented on the Council by the president and one member of the board of directors of each group:

American Foundrymen's Society—Walter L. Seelbach, Superior Foundry, Inc., Cleveland, president, and I. R. Wagner, Electric Steel Castings Co., Indianapolis.

Foundry Educational Foundation —John M. Price, Ferro Machine & Foundry Co., Cleveland, president; Claude B. Schneible, Claude B. Schneible Co., Detroit.

Foundry Equipment Manufacturers' Association—C. V. Nass, president, and Aubrey J. Grindle, Grindle Corp., Markham, Ill.

Foundry Facing Manufacturers' Association—Louis H. Heyl, Federal Foundry Supply Co., Cleveland, president, and F. Ray Fleig.

Gray Iron Founders' Society — E. L. Roth, Motor Castings Co., West

Allis, Wis., president, and Henry J. Trenkamp, Ohio Foundry Co., Cleveland.

Malleable Founders' Society—Cal C. Chambers, Texas Foundries Inc., Lufkin, Texas, president, and A. F. Jackson, Lake City Malleable Co., Cleveland.

National Foundry Association—A. V. Martens, president, and Charles A. Jurgensen, DeLaval Steam Turbine Co., Trenton, N. J.

Non-Ferrous Founders' Society—J. D. Zaiser, Ampco Metal Inc., Milwaukee, president, and William A. Gluntz, Gluntz Brass & Aluminum Foundry Co., Cleveland.

Steel Founders' Society of America—H. A. Forsberg, Continental Foundry & Machine Co., East Chicago, Ind., president, and E. D. Flintermann.

Presidents of the NCC-member organizations will be in the receiving line at the International Reception, May 4, during the 56th Annual A.F.S. Convention and Exhibit and International Foundry Congress in Atlantic City, N. J.

While the original purpose of the Council's formation has been accomplished with the appointment of Foundry Advisory Committees to the Munitions Board, NCC continues to study activities of overall foundry industry interest. The Council has supported the Foundry Educational Foundation program and has continued to make profitable contacts in Washington.

## Actions not binding

Organized only for discussion and possible resolution of industry-wide problems, the Council's actions are not binding upon the various groups but must be referred back to the various societies if any action is to be taken. Thus, solicitation of Safety & Hygiene & Air Pollution funds by the various NCC groups has been independently endorsed by each group.

The nine foundry groups which make up the National Castings Council represent all segments of the foundry industry covering the technical, business, and educational phases of foundry operations. The American Foundrymen's Society, oldest national foundry organization and largest in the world, was formed in 1896 to establish a clearing house for foundry technical information. The original concept of the Society's activities—"to advance the arts and sciences relating to the manufacture and utilization of metal castings"—has guided the organization and its 53 chapters in the United States, Canada, and Mexico throughout the years.

A.F.S. sponsors an annual convention and a bi-annual exhibit, and as a member of the International Committee of Foundry Technical Associations, participates in the International Foundry Congress held each year in one of the countries represented on the Committee. With some 10,000 members in 33 countries, 95 per cent of whom are in chapters, the Society's activities are extremely broad.

National activities are carried out through 102 national technical committees with a membership of over 500. Activities are developed along industry interest lines with divisions for aluminum and magnesium, brass and bronze, education, gray iron, malleable iron, pattern, sand, and steel. Each division sponsors a research project with annual reports being presented at the A.F.S. Convention.

## Broad publishing activities

Over 50 publications covering every field of foundry operation are currently available from A.F.S., in addition to the annually issued TRANSACTIONS and AMERICAN FOUNDRYMAN, published monthly as "The Foundrymen's *Own* Magazine." Headquarters are at 616 S. Michigan Ave., Chicago 5.

The Foundry Educational Foundation held its first annual meeting during the A.F.S. Convention in 1946. Organization meetings started with a gathering of representatives from the Gray Iron Founders' Society, the Malleable Founders' Society, the Steel Founders' Society of America, and A.F.S., October 5, 1945. FEF grew rapidly and now numbers among its members A.F.S., GIFS, MFS, Non-Ferrous Founders' Society, SFSA, and the Foundry Equipment Manufacturers' Association.

Originally operated on funds contributed by foundries, FEF inaugurated a contributing membership plan in late 1951, supplemented by special gifts, grants, and bequests. Objectives of the Foundation, which works with a number of engineering schools through scholarships and fostering industry-education cooperation are: (1) to foster and improve education in the United States in the field of foundry engineering, practice and operation among colleges and universities; (2) to encourage and assist students in acquiring education and training in foundry engineering, practice, and operation; and (3) to develop adequate instruction to carry out these purposes.

Each of the schools with which FEF is actively working is served by an advisory committee of foundrymen in the area. Nationally, the Foundation has a Technical Advisory Committee made up of the technical directors or a representative from each of the member organizations, and a University Advisory Committee composed of a professor from each of the cooperating schools. The FEF office is at 1138 Terminal Tower Building, Cleveland 13.

## Urge better methods

The Foundry Equipment Manufacturers' Association was formed in 1919 while the harassment of a strenuous war period was still keenly in mind. Among the purposes of FEMA are the promotion of better trade practices, the encouragement of research in new and improved foundry processes and methods, and the compilation and distribution of current basic trade information.

Members of FEMA, some 65 manufacturers, represent approximately 80 per cent of the foundry industry's source of basic equipment. FEMA committees include six product groups and an Industrial Hygiene, Safety, and Smoke Abatement Engineering Committee. Office of FEMA is located in the Engineers' Building, Cleveland 14.

In 1913 the principal producers of foundry facings, core binders, and sea coal met to form an organization to better serve the foundry industry. Now known as the Foundry Facings Manufacturers' Association, the organization includes 15 companies which cooperate in standardization and research in foundry facings, pastes, washes, pitches, and sea coal products. The FFMA Traffic Committee has endeavored to have products classified so as to achieve lowest freight rates. Executive office is at 1508 Law & Finance Bldg., Pittsburgh 19.

The Gray Iron Founders' Society adopted a constitution and by-laws and named its first board of directors and officers May 18, 1928, during the A.F.S. Convention in Philadelphia. First president of the organization, known as the Gray Iron Institute until 1933, was Walter L. Seelbach, present president of the American Foundrymen's Society. The new organization developed out of meetings started in 1927 to fill a need for a trade organization de-

voted exclusively to the business problems of gray iron foundries.

Some 550 foundries belonging to GIFS pool their management experience to develop business statistics, cost methods, increased use of gray iron, better public relations, new markets, and new merchandising methods. This is accomplished through group meetings and an annual meeting, through the GIFS bulletin *Gray Iron Industry News* published monthly, and through the activities of national trade and technical committees. Currently in preparation is a handbook on gray iron castings. Office of the Gray Iron Founders' Society is at 210 National City-East 6th Bldg., Cleveland 14.

## Promote product improvement

Known as the Malleable Founders' Society since 1934, this organization started in 1897 as the American Malleable Castings Association, becoming the Malleable Iron Research Institute in 1927. In general, the aims of all these organizations have been product improvement, research, and market development, and the memberships—held by companies—have been similar through the years. In addition to trade problems, MFS has contributed greatly to improvement in quality through a program of daily tests on bars supplied by Society members initiated in 1913. The organization maintains its own chemical and metallurgical testing laboratories and carries on plant inspections and research.

Regular regional meetings of malleable founders are held, along with a mid-year, an annual meeting and market development conferences. MFS has published the handbook *American Malleable Iron*, has issued a color-sound film entitled *"This Moving World,"* and periodically publishes *Malleable Iron Facts*, a leaflet illustrating properties and uses of malleable castings. MFS has offices at Union Commerce Bldg., Cleveland 14.

National Foundry Association, management association of the industry representing foundries casting all types of alloys, was founded in 1898. Service to its member companies is carried on in the fields of labor relations, representation in Washington, D. C., and with other foundry, trade, and management organizations, in safety, training, community relations, wage studies, labor and legislative problems, insurance, accounting, business news, and in government controls and regulations.

NFA issues business bulletins to members, has published several booklets on training, occupational ratings, and has in process a cost accounting manual. The organization holds regional meetings which are helpful in solving local management problems and conducts an annual business meeting. The NFA office is at 53 W. Jackson Blvd., Chicago 4.

The Non-Ferrous Founders' Society is a national trade organization of firms producing non-ferrous castings. Formally organized April 28, 1943, the Society has grown from 75 to nearly 500 members. NFFS groups hold local and regional meetings, and once a year the membership gathers for an annual business meeting.

Activities of NFFS include liaison with the National Production Authority and the Office of Price Stabilization, distribution of materials and price orders, periodic labor rate surveys, preparation of a cost manual, and publication of a monthly pamphlet, *The Crucible*. Office of the organization is at 192 N. Clark St., Chicago 1.

The Steel Founders' Society of America developed out of informal meetings of a few steel foundrymen starting in 1902. The organization has developed into a combined trade and technical society with memberships held by most of the country's more than 300 steel foundries representing some 90 per cent of the steel castings capacity.

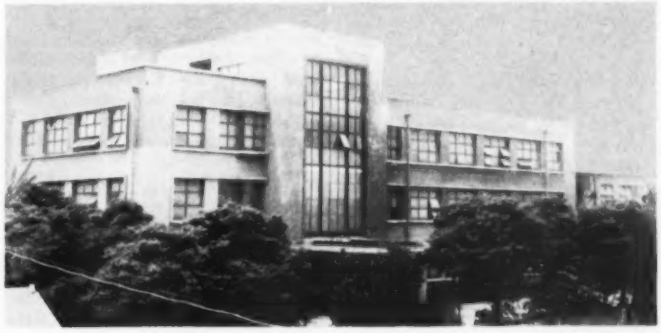
Committees of SFSA develop information for the membership in the fields of product development, labor relations and negotiations, foreman education, shop rules, safety, business statistics, and specifications, and carry on work in the field of education and public relations.

The Society conducts research on steel casting fundamentals and in product improvement, some of the results appearing in periodicals and in transactions of technical societies, much of the work being privately distributed to SFSA members only through *Steel Foundry Facts*. District meetings for technical and operating men are held periodically and an annual and a mid-year meeting are held. Publications include the *Steel Castings Handbook* and a number of booklets, charts, and sound-slide films. Headquarters of SFSA are at 920 Midland Bldg., Cleveland.

### ▶ *Solicit written discussion of 1952 Convention papers*

■ Convention attendants are urged to prepare written discussion of papers to be presented in Atlantic City as a convenience to authors and recorders. This year discussion will not be taken by stenotypists. Instead committee members will act as recorders at the various sessions, making notes of major points brought out following presentation of the papers and the names of those who engage in the discussion, whether oral or written. If discussion is written, copies should be available for both author and recorder.

## ▶ *Modern castings research laboratory*



**This modern castings research laboratory, built at Japan's Waseda University, Tokyo, in 1938 by donations from prominent industrialists, employs some 15 professors and 30 assistants, all engaged in full-time basic foundry research. Dormant during World War II, the laboratory is now fully engaged on 50 projects, according to Professor Ichiro Iitaka, director. The main building is concrete, five stories with basement. Two experimental foundries are separate.**

# Plant visitation

■ Extensive variety of plants will be open for inspection by visitors to the 1952 A.F.S. International Foundry Congress the week of May 1 through 7. Located in New Jersey and its bordering states, Pennsylvania and Delaware, some 17 foundries, both ferrous and non-ferrous and covering a wide range of operating methods, will be open. Also available for inspection is a coke plant, and on May 2 and 6 chartered buses will take visitors on a tour of nine of New Jersey's famous foundry sand deposits and sand processing plants.

Members of the A.F.S. Philadelphia Chapter comprise the 1952 International Foundry Congress Plant Visitations Committee. Responsible for arranging tours of area foundries, the Committee will man the Plant Visitations Booth in Convention Hall. Members are:

Chairman Arnold N. Kraft, Wilkening Mfg. Co.; Co-Chairman C. W. Mooney, Link-Belt Co.; Lou Dill, Geo. F. Pettinos Co.; Dan Jones, New Jersey Silica Sand Co.; J. Gifford Weaver, Eastern Malleable Iron Co.

Kenneth Davis, Budd Mfg. Co.; W. F. Graden, Simonds Abrasive Co.; Manny Enderlein, H. G. Enderlein Co.; Robert Carrigan, North American Smelting & Refining Co.

John Robb, Hickman, Williams & Co., Inc.; J. L. Furey, Taggart Brimfield Co.; Alan Johnson, Debevoise-Anderson Co.; Donald MacBrien, Philadelphia Coke Co.; Stanley Bentley, Crucible Steel Castings Co.

W. D. Byrden, Philadelphia Brass & Bronze Co.; H. M. Stuart, U. S. Pipe & Foundry Co.; Warren Brown, Florence Pipe Foundry & Machine Co.; Harvey Johnston, General Steel Castings Corp.

Edward Berry, Dodge Steel Co.; Cy Somers, Whitehead Bros. Co.; Herman Mandel, Pennsylvania Foundry Sand & Supply Co.; George Bradshaw, Philadelphia Navy Yard; and B. A. Miller, Baldwin-Lima-Hamilton Corporation.

Foundries, sand deposits and sand processing plants and the coke plant open for inspection are:

## Foundries

**Atlantic Steel Castings Co.**, Chester, Pa. (May 2 and 6, a.m. and p.m.) Steel jobbing foundry making marine, railway and industrial castings from 10 to 10,000 lb.

**Budd Co.**, Philadelphia. (May 2, 5, 6 and 7, a.m. and p.m.) Mechanized gray iron foundry making automotive brake drums.

**Crown Non-Ferrous Foundry**, Chester, Pa. (May 2, 5, 6 and 7, a.m. and p.m.) Makes marine and heavy machinery castings of brass and bronze and babbit metal.

**Crucible Steel Castings Co.**, Lansdowne, Pa. (May 2, 5, 6 and 7, 9:30 a.m. to 12:00 noon). Semi-mechanized steel jobbing foundry.

**Dodge Steel Co.**, Philadelphia. (May 2, a.m.; May 6, a.m. and p.m., 20 limit) Steel jobbing foundry making carbon and low alloy castings. Acid electric furnaces.

**Eastern Malleable Iron Co.**, Wilmington, Del. (May 2, 5, 6 and 7, 1:00-3:30 p.m.) Makes heavy duty truck castings of pearlitic malleable and carbon steel. Air furnace and converter melting, electric furnace, radiant tube annealing.

**H. G. Enderlein Co.**, Philadelphia. (May 2, 5, 6 and 7, a.m. and p.m.) Gray iron jobbing foundry making castings to 3 tons.

**Florence Pipe Foundry & Machine Co.**, Florence, N. J. (May 2, 1:30-3:30 p.m., 100 limit) Sand spun and centrifugally cast iron pipe and general castings to 25,000 lb.

**Olney Foundry Div., Link-Belt Co.**, Philadelphia. (May 2, 6 and 7, a.m. and p.m., 100 limit) Mechanized gray iron jobbing foundry making varied castings to 10,000 lb.

**Palmyra Foundry Co.**, Palmyra, N. J. (May 2, 5, 6 and 7, 2.00-3:30 p.m.) Gray iron and alloy iron machinery castings to 10,000 lb.

**Philadelphia Bronze & Brass Corp.**, Philadelphia. (May 5, 6 and 7, 10:00 a.m. to 2:00 p.m.) Non-ferrous jobbing foundry making castings to 8,000 lb in wide range of alloys and sizes.

**Philadelphia Naval Shipyard** (May 2, 3, 5, 6 and 7, 1:00 to 3:30 p.m., overseas visitors must be cleared) Gray iron, steel, brass and bronze and aluminum castings.

**Salem Pipe & Iron Mfg. Co.**, Bridgeton, N. J. (May 2, 5, 6 and 7, a.m.) Gray iron. Soil pipe and fittings.

**U. S. Pipe & Foundry Co.**, Burlington, N. J. (May 2, a.m., 100 limit) Centrifugal cast iron pipe in metal molds; fitting in green sand, dry sand and loam.

**Welsbach Corp.**, Philadelphia. (May 2, 5, 6 and 7, a.m.) Modern brass and bronze foundry.

**Wilkening Mfg. Co.**, Philadelphia. (May 6, 10:00 a.m.-2:00 p.m.) Gray iron production foundry making piston ring castings.

**Williamstown Foundry Corp.**, Williamstown, N. J. (May 2, 5, 6 and 7, 10:00 a.m.-2:00 p.m.) Gray iron soil pipe and fittings.

## Coke plant

**Philadelphia Coke Co.**, Philadelphia. (May 2, 5, 6 and 7, a.m. and p.m.) Producers of foundry industrial and domestic coke. Complete processing facilities for production of coke for the foundry industry.

## Sand plants

***The sand-producing companies listed will provide transportation for visitors on May 2 and 6. Arrangements may be made with Plant Visitations Desk at Convention Hall.***

**Daniel Goff Co.**, Clayville, N. J. Naturally bonded foundry sands. Clay deposits.

**Millville Silica Sand & Gravel Co.**, Port Elizabeth, N. J. Sand deposits and wash plant. Special blend, core, furnace and blast sands.

**Jessie S. Morie & Son**, Mauricetown, N. J. Dredges, washers and dryers for producing unbonded sands.

**National Pulverizing Co.**, Millville, N. J. Three large grinding mills for producing silica flour from 90 to 325 mesh. Vibrating screens for sandblast grades. Modern dryers.

**George F. Pettinos, Inc.** Manumuskin, N. J. Screening, washing and drying plant for silica sands.

**Taggart Brimfield Co.**, Hammonton, N. J. Pits and screens for gravels, molding and clay sands.

**Tri State Sand Co.**, Millville, N. J. Produces naturally-bonded sands.

**Whitehead Bros. Co.**, Dividing Creek, N. J. Wash plant, screening and drying of silica sands.

**Whitehead Bros. Co.**, Dorchester, N. J. Screening plants for producing naturally bonded gravels, molding sands and clays.

# ▸ *International Study Tour hosts named*

▪ Six A.F.S. Chapters—Metropolitan, Western New York, Northeastern Ohio, Cincinnati District, Detroit, and Chicago—plus the Pittsburgh Foundrymen's Association will cooperate in arranging plant visits for members of the International Study Tours visiting this country from April 18 to May 14.

The tours will sail from Europe to arrive in New York April 18, where they will be briefed by the Mutual Security Agency. As arranged by the chapter committees listed below the tours will visit various foundry operations in the New York, Cleveland, Cincinnati, Detroit, Chicago, Buffalo and Pittsburgh areas. In addition, tour members will attend the 1952 A.F.S. International Foundry Congress & Show the entire week of May 1 through 7, and will later be welcomed by MSA and consular representatives of their respective nations on a visit to Washington, D. C.

Members of A.F.S. Study Tour Chapter Committees and of the Pittsburgh Foundrymen's Association who will be hosts to international tour visits in their respective areas are:

**Metropolitan:** (International Committee) Chairman Dan Polderman, Jr., Whiting Corp. (Plant Visits) Chairman H. A. Deane, American Brake Shoe Co., and Philip T. Gray, Jr., Whiting Corp. (Entertainment) Chairman Howard Voit, Sterling Wheelbarrow Co.

**Detroit:** Chairman Harry E. Gravlin, Ford Motor Co.; Vaughan C. Reid, City Pattern Foundry & Machine Co.; Michael Warchol, Atlas Foundry Co.; Robert L. Orth, American Wheelabrator & Equipment Corp.; E. J. Passman, Frederic B. Stevens, Inc.; Alexander A. Andrew, Pontiac Motor Div., GMC; S. H. Cleland, Eastern Clay Products, Inc.; E. W. Gerhard, Jr., Swedish Crucible Steel Co.; R. Grant Whitehead, Claude B. Schneible Co.; Crary Davis, Aluminum Co. of America; W. E. Kidwell, Packard Motor Car Co.; C. W. Hockman, Cadillac Motor Car Div., GMC; L. H. Kinney, Dodge Div., Chrysler Corp.; H. G. McMurry, Ford Motor Co.; and John J. Watson, C. O. Bartlett & Snow Co.

**Chicago:** (Plant Visits) Chairman H. K. Briggs, Miller & Co.; Vice-Chairman L. H. Rudesill, Griffin Wheel Co.; Frank Wartgow, Ford Motor Co.; Leroy Taylor, Goebig Mineral Supply Co.; Fred L. Riddell, H. Kramer & Co.; Earl Ross, Penton Publishing Co.; H. W. Johnson, Wells Mfg. Co.; A. W. Anderson, International Harvester Co.; and George W. Johnson, Vanadium Corp. of America.

**Pittsburgh Foundrymen's Association:** (Reception and Plant Visits) Chairman Henry P. Spilker, Sterrit-Thomas Foundry Co.; L. W. Mesta, Mesta Machine Co.; H. T. Herr, Jr., J. S. McCormick Co.; W. B. Wallis, Pittsburgh Lectromelt Furnace Co.; O. E. Decker, Acheson Mfg. Co.; Frank B. Mahoney, Richmond Radiator Co.; Harold Gassner, Rosedale Foundry & Machine Co.; H. B. Reed, Westinghouse Airbrake Co.; E. P. Buchanan, Pittsburgh Coke & Chemical Co.; F. H. Reuwer, Westinghouse Electric Corp.; C. M. Kelly, Kelly Foundry Co.; L. B. McCully, Westinghouse Electric Corp.; and F. C. T. Daniels, MacKintosh-Hemphill Co.

**Western New York:** (Plant Visits) Chairman J. H. Sander, Tonawanda Electric Steel Casting Co.; Robert Bruce, Blaw-Knox Co.; W. H. Oliver, American Radiator & Standard Sanitary Corp. (Reception) Erwin Deutschlander, Worthington Pump & Machinery Corp.; Carl A. Harmon, Hanna Furnace Corp.; Roger E. Walsh, Hickman, Williams & Co., Inc.; M. W. Pohlman, Pohlman Foundry Co.; Robert Bruce, Blaw-Knox Co.; A. J. Heysel, E. J. Woodison Co.; R. D. Young, Lumen Bearing Co.; A. A. Diebold, Atlas Steel Casting Co.; J. M. Clifford, Bison Castings; W. H. Oliver, American Radiator & Standard Sanitary Corp.; J. H. Sander, Tonawanda Electric Steel Casting Co.; W. P. Quinn, Pratt & Letchworth Co.; Leonard Greenfield, Samuel Greenfield Co.; and Joseph Zahm, Master Pneumatic Tool Co.

**Northeastern Ohio:** (Reception and Plant Visits) Chairman L. T. Crosby, Sterling Wheelbarrow Co.; Vice-Chairman John Schneider, Cleveland Electric Illuminating Co.; Frank Barton, Fulton Foundry & Machine Co.; Maurice F. Degley, Ferro Machine & Foundry, Inc.; Lloyd Leesberg, Superior Foundry, Inc.; Stephen E. Kelly, Eberhard Mfg. Co.; Charles F. Seelbach, Jr., Forest City Foundries Co.; George Leroux, National Malleable & Steel Castings Co.; Thomas West, West Steel Castings Co.; Howard E. Heyl, Federal Foundry Supply Co.; Harold Strater, North American Refractories Co.; Werner B. Bishop, Archer-Daniels-Midland Co.; Gilbert J. Nock, Nock Fire Brick Co.; and John A. Sharrits, John A. Sharrits Co.

**Cincinnati District:** (Plant Visits) Chairman A. W. Schneble, Jr., Advance Foundry Co.

# International Authors

Henton Morrogh

John Sissener

A. L. Portevin

Robert Doat

J. S. Abcouwer

B. Langum

■ Unusually large number of overseas foundrymen will contribute toward making the 1952 International Foundry Congress & Show an event of truly world-wide interest by presenting technical papers.

Outstanding metal casting authorities from Australia, Belgium, France, Italy, Netherlands, Norway, Sweden and the United Kingdom will present the Official Exchange Papers from the foundry technical associations of their respective nations, while others will present technical papers on a variety of foundry subjects.

In chronological order of their presentation at the 1952 A.F.S. International Foundry Congress, the papers are:

*"Influence of Aluminum on Properties of Cast Iron Gun-Metal and Removal of Aluminum by Slag,"* by A. V. Larsson, AB Svenska Metallverken, Vasteras, Sweden. Official Exchange Paper from Sveriges Mekanforbund (Foundry Section, Federation of Swedish Mechanical Engineers) to be presented at 10:00 a.m. May 2, Brass & Bronze.

*"Practical Aspects of Olivine as a Molding Material,"* by John Sissener and B. Langum, A/S Myrens Verkstad, Oslo. Official Exchange Paper from Stopenteknik Forening (Norwegian Foundrymen's Association) to be presented at the 10:00 a.m., May 3, Sand Session.

*"A Study of the A.F.S. Fineness Test,"* by H. A. Stephens, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia. Official Exchange Paper from the Victorian Division, Institute of Australian Foundrymen, to be given during the 2:00 p.m., Saturday, May 3, Gray Iron Session.

*"Influence of Oven Atmosphere on Drying of Molds and Baking of Cores,"* by G. Ulmer and Maurice DeCrop, Centre Technique des Industries de la Fonderie, Paris, will be given at the 4:00 p.m., May 3, Sand Session.

*"Gases and Naturally-Occurring Blowholes in Foundry Practice,"* by Albert L. Portevin, Institute de France, Paris, will be given at the 2:00 p.m., May 4, Gray Iron Session. This is the Official Exchange Paper from France's Association Technique de Fonderie (French Foundry Technical Association).

Two papers from Italy will be presented at the 2:00 p.m., May 4, Gray Iron Session: *"A New Process for the Industrial Production of Nodular Iron with Low Treatment Costs,"* by Carlo Longaretti and Mario Noris, Institute of Siderurgy Finsider, Genoa, Exchange Paper of the Italian Metallurgical Association, and *"Production of Heavy Spheroidal Graphite Cast Iron,"* by Corrado Galletto.

*"Metallurgical Blast Cupola,"* by Robert Doat, Compagnie General des Conduites d'Eau, Liege, Belgium, and M. A. DeBock, consulting engineer, Brussels. Official Exchange Paper from the Association Technique de Fonderie Belgique, scheduled for 10:00 a.m., May 5, Gray Iron Session.

*"Sand Control with Particular Reference to the Prevention of Scabbing,"* by W. B. Parkes, British Cast Iron Research Association. Official Exchange Paper from the Institute of British Foundrymen, to be given at 10:00 a.m., Monday, May 5, Sand Session.

*"Space, Time and Temperature Relations,"* by J. S. Abcouwer, Werkspoor N. V., Utrecht, Netherlands. Official Exchange Paper from the Nederlandsche Vereeniging van Gieterij-Technici (Netherlands Foundry Technical Association) to be presented at the 2:00 p.m., May 6, Heat Transfer Session.

*"A Study of the Formation of Nodular Graphite"* will be given by Frederik Hurum of the Norway Institute of Technology, during the 4:00 p.m., May 6, Gray Iron Session.

Speakers at the International Educational Dinner at 6:30 p.m., May 6, will be Noel P. Newman, Newman, Hender & Co., Gloucester, England, past president, Institute of British Foundrymen, and Tom Makemson, IBF Secretary.

*"Influence of Some Residual Elements, and Their Neutralization in Magnesium-Treated Nodular Iron"* will be the topic of a talk by Henton Morrogh of the British Cast Iron Research Association at the 10:00 a.m., May 7, Gray Iron Session.

# Foundries meeting real challenge as

# *S & H & AP funds grow steadily*

■ Solicitation of funds to a total of $350,000 for the A.F.S. Safety & Hygiene & Air Pollution Program for the foundry industry is now entering its most active and important phase. Following the splendid original impetus given the program by all foundry trade associations in the National Castings Council, major elements of the industry are now alerted to the need for prompt support of the Safety & Hygiene & Air Pollution program.

## Small foundries respond

One amazing development in the program has been the immediate response from many small foundries whose management has proved particularly foresighted in interpreting future problems related to foundry plant conditions.

## Proportionate contributions

Some question has been raised regarding the published formulae for contributions to the program. The formulae approved by the A.F.S. Board of Directors were intended to be minima, enabling any foundry, no matter how small, to have a "stake in the game."

At the same time it is anticipated that larger plants, who may be expected to benefit most from the program, will elect contributions in excess of the published minima.

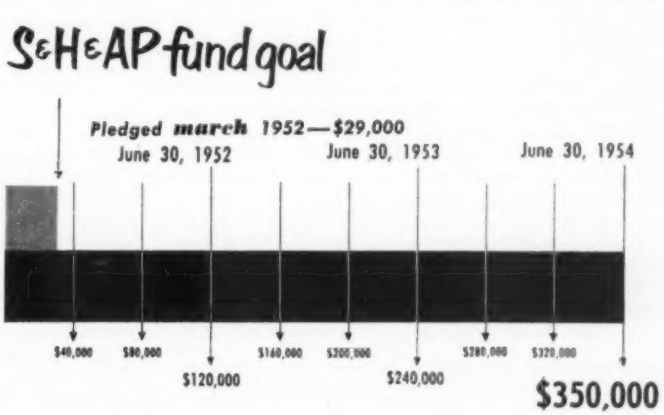
The time is now here for all foundries to indicate their willingness to support a program that has been approved by all elected representatives of the major foundry associations and is undertaken for the industry as a whole.

As stated in the original brochure for the program, "the castings industry must assume leadership in developing its own standards of working conditions."

To meet this challenge, to the foundry industry, contributions should be sent direct to American Foundrymen's Society, 616 S. Michigan, Chicago 5, Ill.

## S & H & AP Contributors to March 31, 1952

Ailoy Cast Steel Co., Marion, Ohio.
Allied Steel Castings Co., Harvey, Ill.
Allis-Chalmers Mfg. Co., Milwaukee.
American Car and Foundry Co., New York.
American Cast Iron Pipe Co., Birmingham, Ala.
T. L. Arzt Foundry Co., Chicago, Ill.
John H. Best & Sons, Inc., Galva, Ill.
Black-Clawson Co., Hamilton, Ohio.
Boston Electro Steel Casting, Inc.
The Buckeye Steel Castings Co., Columbus, Ohio.
Bushings, Inc., Philadelphia, Pa.
Edwin S. Carman, Inc., Cleveland.
Chicago Heights Brass Foundry, Chicago Heights, Ill.
Chicago Malleable Castings Co.
Crane Co., Chicago, Ill.
Cutler Hammer, Inc., Fdy. Div., Milwaukee.
The Dexter Co., Fairfield, Iowa.
Benjamin Eastwood Co., Paterson, N. J.
The Falk Corp., Milwaukee.
Farrel-Birmingham Co., Ansonia, Conn.
Frank Foundries Corp., Davenport.
Frank Foundries Corp., Moline, Ill.
The Gignall Co., Medina, N. Y.
Grede Foundries, Inc., Milwaukee.
Hanford Foundry Co., San Bernardino, Calif.
The Hartford Electric Steel Corp., Hartford, Conn.
James Jones Co., Los Angeles, Calif.
Kay-Brunner Steel Products, Inc. Alhambra, Calif.
Kendrick Mfg. Co., Detroit, Mich.
The Keuthan Foundry Co., Middletown, Ohio.
The Keyes-Davis Co., Burr Oak Brass & Aluminum Div., Burr Oak, Mich.
Kincaid-Osburn Electric Steel Co., San Antonio, Texas.
Lake City Malleable Co., Cleveland.
Lakeside Malleable Castings Co., Racine, Wis.
Lindgren Foundry Co., Batavia, Ill.
Moline Malleable Iron Co., St. Charles, Ill.
Neenah Foundry Co., Neenah, Wis.
Newark Malleable Iron Works, Newark.
Olympic Steel Works, Seattle, Wash.
Overmyer Mould Co. Inc., Winchester, Ind.
Sacks-Barlow Foundries, Inc., Newark.
The Sawbrook Steel Castings Co., Cincinnati.
Sprout, Waldron & Co. Inc., Muncy, Pa.
Vulcan Foundry Co., Oakland, Calif.



Convention Preprint ★

# Standards for rough chipping and removing welds

DEAN VAN ORDER / *Industrial Engineer, Burnside Steel Foundry Co., Chicago.*

■ The most variable operation in the foundry cleaning room is the removal of excess metal and welds. Generally speaking, the chipping and hand grinding operation must put the casting in a condition satisfactory for shipment to the customer. These operations must also correct any defective workmanship of production departments which may have resulted in a poor casting, besides performing the normal work of removing excess metal.

The normal work of chipping and grinding rough castings would consist of removing excess metal in the form of heads or gates that could not be ground on swing grinders, (vents, brackets, fin, nails, chills and similar operations). This type of work when uniform is comparatively easy to measure. The corrective part of the chipping and grinding operation consists of removing burned in sand, extra heavy fin, scabs, welds, swells and other abnormal elements. This part of the operation is one which can never be completely controlled by the production department and is the major item contributing to the variability of the chipping and grinding work.

### Previous Methods of Measuring

Several methods of measuring both the simple and complex parts of this operation were tried before the present system was adopted. Originally, the chipping and grinding operation was a group set-up with each of the men sharing equally in the earnings of the group. This method had its merits in that it was rather easy to maintain and did not require any complex check of production; on the other hand, the degree of incentive was low since the individual did not profit in proportion to his own productivity but rather from the productivity of the group as a whole. Under the group set-up, only the chipping and grinding of rough castings was covered by standards; the removal of welds was not measured in any way but was paid for as day work.

Following the elimination of the group set-up, standards were set for individual piece work. At this time rough and finish chipping was combined, and each operator was equipped with an air grinder, electric grinder, chipping hammer, and individual hoist (Fig. 1 and 2). Standards were also set on the removal of welds. The area of the weld was measured and then classified as Spot, Small, Medium or Large. Time values were set for each of these classifications with an additional allowance for handling depending upon the weight of the casting. Although this method of measurement was a great improvement over the original group set-up and also gave a greater coverage, there were still disadvantages. Checkers had to be hired to measure welds and record pieces and pattern numbers. The accuracy of checking and measuring welds depended entirely upon the type of individual hired for the job and became increasingly apparent with labor turnover. Many castings reverted back to a daywork basis because of unmeasurable amounts of burned in sand and extra heavy fins. Consequently, an improved method was necessary to simplify the checking and still get an accurate coverage of all classes of work on an individual basis.

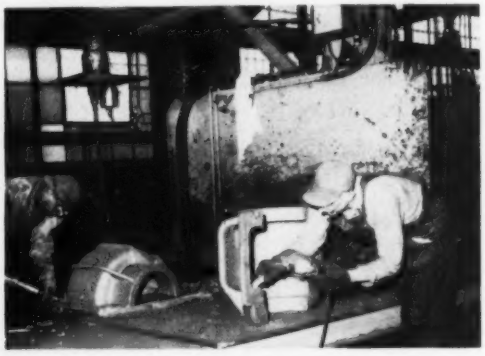


*Fig. 1 . . . Front view of chippers bench. Notice that each operator is equipped with air grinder, other items.*

After considerable research, the electrical department was able to develop a meter recorder which would show the total time that the air grinder, electric grinder, and chipping hammer were operating

**Preprint No. 52-73.** This paper will be presented at a Timestudy and Methods Session of the 56th Annual Meeting, American Foundrymen's Society, at Atlantic City, N. J., May 1-7, 1952.

over the day. The writer would like to emphasize that this is a recording of the actual running time of the equipment and not contact time with the castings. Although this meter recorder is rather simple in design, the final assembly and adjustment is of a very delicate nature. The valve that measures the flow of air is composed of an inlet valve and seat, two magnets, a contact screw, an adjusting nut and counterweight, and an outlet opening for the air. The pressure of air on the incoming valve plunger opens the valve and allows the air to flow to the chipping hammer and air grinder. The machining of the valve plunger and valve seat is very important. The angle of the seat must be maintained at a certain degree to allow the air to flow through at constant pressure. The use of the air tool causes air to flow through the air valve which raises magnet A allowing magnet B to drop, thus breaking the contact between the contact

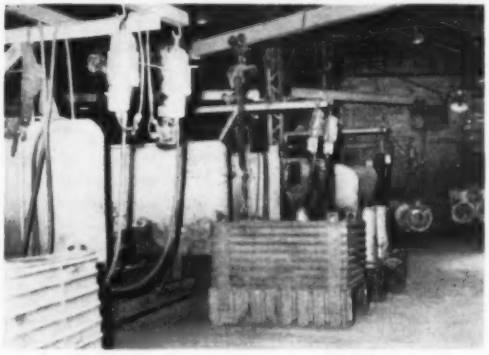


*Fig. 2 . . . General view of back of chipping line. The arrangement of hoists and air grinders is conspicuous.*

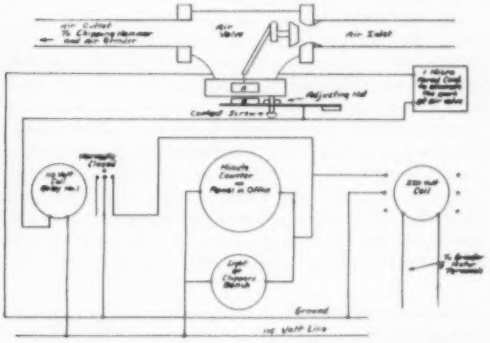



*Fig. 3 . . . Diagram of layout and wiring of minute meter recorder, attached to grinders and hammers.*

screw and valve body which de-energizes the relay allowing the minute counter to run (Fig. 3). It is very important to see that the air pressure in the lines is kept constant (80 to 90 lb) and free of moisture, rust, and dirt. Any obstruction that would lodge in the valve or valve seat could result in an improper reading at the minute counter. The valve and meter assembly should be inspected and cleaned regularly. A light is hooked up in relay with the minute counter and used to indicate to the operator and inspector that the equipment is working properly.

### Centrally Located Counters

A meter assembly was installed in a dust proof metal case at each work station (Fig. 4). The minute counter for each meter assembly was installed on a single panel in the foreman's office where the amount of minutes produced by each operator could be seen at a glance (Fig. 5). Although each work station is equipped with a meter recorder and minute counter, they are only used for means of payment when the operator is removing welds, or very excessive burnt sand or fins not covered by the chipping table.

The removal of welds (which had always been costly to check and inspect and was only at best moderately accurate in the method of measurement) could now be placed on individual piece work with a minimum of checking and inspecting. Studies were taken on all types, classes and weights of welded castings. An allowance for handling castings (placing casting on work bench either by hand or with hoist, turning casting over, removing casting when completed), was determined depending on the weight of the casting. An additional allowance of 40 per cent was added to the minutes taken from the minute counter for each operator. The additional allowance is composed of 30 per cent for incentive earnings and fatigue, and 10 per cent for looking for welds and a visual inspection by the operator of the weld when finished.

### Method of Weld Removal

Almost all the welds are removed with the electric grinder unless they are not accessible to the 8-in. grinding wheel, in which case they may be chipped or removed with a small spindle or cone wheel. Since the electric grinder, air grinder and chipping hammer are all metered through the minute counter, the operator may use whichever tools he chooses. Studies were also taken on chipping out cracks before welding. This type of work is in the minority and is performed only on certain alloy castings and special jobs; however, an additional allowance had to be established. Working strictly with a chipping hammer is much more fatiguing than operating an electric or air grinder, and also builds up less minutes on the minute counter. For this reason, an additional allowance of 110 per cent was added to the minutes taken from the minute counter.

### Composition of Allowance

This additional allowance is composed of exactly 50 per cent for incentive and fatigue, 30 per cent for handling the chipping hammer, and 30 per cent for locating cracks and inspecting to see if the crack has been completely chipped out. An additional allowance of five minutes per hour on standard is added to both removing welds and chip for welding, for sharpening chisels and changing tools. Ten minutes per day is

added for getting out equipment in the morning and putting it away at night (Fig. 6 and 7 are reproductions of forms demonstrating this).

Rough chipping had previously been on an individual piece work basis, so the same principles were applied in establishing new standards. Studies were taken on various types of castings and compiled on a standard data sheet which emphasized the fact that fin and sand were the variables that were going to contain the greatest degree of fluctuation. Fin or parting was broken into four classifications: (1) edge regular and spoke fin, (2) edge core fin, (3) flat regular fin, (4) flat core fin. The definitions for these classifications are more or less self-explanatory. Edge regular fin is formed where the parting line is on the corner of a casting. Edge core is formed where a core meets the corner of a casting. Flat regular fin is formed where the parting line is in the center of the casting or on a flat surface. Flat core fin is formed where two cores come together on the flat surface of a casting.

In addition to classifying the types of fin, it was found that the actual length and thickness of the fin varied very closely with the weight of the casting. All studies were taken on the actual amount of fin that appeared in each classification, and then the time was plotted against the potential fin. This makes it possible for the rate setter to measure the potential fin from the pattern. Castings made from loose patterns are only a small percentage of the work that goes through the chippers, yet studies had to be taken and values set for fin and parting. The majority of the loose work is of a more difficult nature than the mounted work, as the studies showed. To cover this difference, it was found that the fin and parting standards had to be doubled over that for mounted fin.

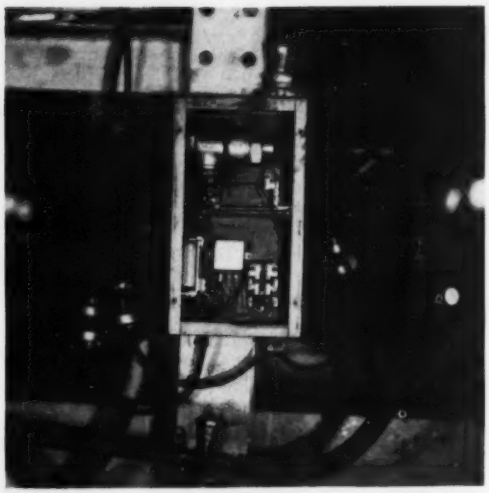


*Fig. 4 . . . The installed meter assembly. Note light.*

Tables were made up from the studies on miscellaneous items, such as removing brackets, heads or gates, nail, vent, core wire, chill prints, etc. (Table 2). The allowances for handling were based on the weight of

MOUNTED FIN AND PARTING TABLE

| Length in Inches | 0-200# | | | | 201-400# | | | | 401-600# | | | | 601-Up | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reg Spoke | Edge Core | Flat Reg. | Flat Core | Reg Spoke | Edge Core | Flat Reg. | Flat Core | Reg Spoke | Edge Core | Flat Reg. | Flat Core | Reg Spoke | Edge Core | Flat Reg. | Flat Core |
| 0- 10 | .14 | .27 | .41 | .53 | .14 | .29 | .43 | .56 | .24 | .48 | .72 | .93 | .29 | .57 | .86 | 1.10 |
| 11- 20 | .21 | .41 | .62 | .78 | .19 | .47 | .70 | .89 | .42 | .84 | 1.26 | 1.59 | .42 | 1.12 | 1.68 | 2.10 |
| 21- 30 | .28 | .55 | .83 | 1.04 | .32 | .64 | .97 | 1.21 | .60 | 1.20 | 1.80 | 2.25 | .84 | 1.67 | 2.51 | 3.11 |
| 31- 40 | .35 | .69 | 1.04 | 1.29 | .41 | .82 | 1.23 | 1.53 | .78 | 1.56 | 2.34 | 2.90 | 1.11 | 2.22 | 3.33 | 4.11 |
| 41- 50 | .42 | .83 | 1.25 | 1.55 | .50 | 1.00 | 1.50 | 1.86 | .96 | 1.92 | 2.88 | 3.56 | 1.39 | 2.76 | 4.15 | 5.11 |
| 51- 60 | .49 | .97 | 1.46 | 1.80 | .59 | 1.18 | 1.77 | 2.18 | 1.14 | 2.28 | 3.42 | 4.22 | 1.66 | 3.31 | 4.97 | 6.11 |
| 61- 70 | .56 | 1.11 | 1.67 | 2.06 | .68 | 1.35 | 2.03 | 2.50 | 1.32 | 2.64 | 3.96 | 4.88 | 1.93 | 3.86 | 5.79 | 7.11 |
| 71- 80 | .63 | 1.25 | 1.88 | 2.31 | .77 | 1.53 | 2.30 | 2.83 | 1.50 | 3.00 | 4.50 | 5.54 | 2.21 | 4.41 | 6.62 | 8.12 |
| 81- 90 | .70 | 1.39 | 2.09 | 2.57 | .86 | 1.71 | 2.57 | 3.15 | 1.68 | 3.36 | 5.04 | 6.19 | 2.48 | 4.95 | 7.44 | 9.12 |
| 91-100 | .77 | 1.53 | 2.30 | 2.82 | .95 | 1.89 | 2.83 | 3.48 | 1.86 | 3.72 | 5.58 | 6.85 | 2.76 | 5.50 | 8.26 | 10.12 |
| 101-110 | .84 | 1.67 | 2.51 | 3.08 | 1.03 | 2.06 | 3.10 | 3.80 | 2.05 | 4.08 | 6.13 | 7.51 | 3.03 | 6.05 | 9.08 | 11.12 |
| 111-120 | .91 | 1.81 | 2.72 | 3.33 | 1.12 | 2.24 | 3.36 | 4.13 | 2.23 | 4.44 | 6.67 | 8.17 | 3.31 | 6.60 | 9.90 | 12.12 |
| 121-130 | .98 | 1.95 | 2.93 | 3.59 | 1.21 | 2.42 | 3.63 | 4.45 | 2.41 | 4.80 | 7.21 | 8.83 | 3.58 | 7.14 | 10.73 | 13.13 |
| 131-140 | 1.05 | 2.09 | 3.14 | 3.84 | 1.30 | 2.60 | 3.90 | 4.77 | 2.59 | 5.16 | 7.75 | 9.48 | 3.86 | 7.69 | 11.55 | 14.13 |
| 141-150 | 1.12 | 2.23 | 3.35 | 4.10 | 1.39 | 2.77 | 4.16 | 5.10 | 2.77 | 5.52 | 8.29 | 10.14 | 4.13 | 8.24 | 12.37 | 15.13 |
| 151-160 | 1.19 | 2.37 | 3.56 | 4.35 | 1.48 | 2.95 | 4.43 | 5.42 | 2.95 | 5.88 | 8.83 | 10.80 | 4.40 | 8.79 | 13.19 | 16.13 |
| 161-170 | 1.26 | 2.51 | 3.77 | 4.61 | 1.57 | 3.13 | 4.70 | 5.75 | 3.13 | 6.24 | 9.37 | 11.46 | 4.68 | 9.33 | 14.01 | 17.13 |
| 171-180 | 1.33 | 2.65 | 3.98 | 4.86 | 1.66 | 3.31 | 4.96 | 6.07 | 3.31 | 6.60 | 9.91 | 12.12 | 4.95 | 9.88 | 14.84 | 18.14 |
| 181-190 | 1.40 | 2.79 | 4.19 | 5.12 | 1.75 | 3.48 | 5.23 | 6.39 | 3.49 | 6.96 | 10.45 | 12.77 | 5.23 | 10.43 | 15.66 | 19.14 |
| 191-200 | 1.47 | 2.93 | 4.40 | 5.37 | 1.84 | 3.66 | 5.50 | 6.72 | 3.67 | 7.32 | 10.99 | 13.43 | 5.50 | 10.98 | 16.48 | 20.14 |
| 201-220 | 1.59 | 3.14 | 4.71 | 5.76 | 1.97 | 3.93 | 5.90 | 7.20 | 3.94 | 7.86 | 11.80 | 14.42 | 5.91 | 11.80 | 17.71 | 21.64 |
| 221-240 | 1.71 | 3.42 | 5.13 | 6.27 | 2.15 | 4.28 | 6.43 | 7.85 | 4.30 | 8.58 | 12.88 | 15.73 | 6.46 | 12.89 | 19.36 | 23.65 |
| 241-260 | 1.85 | 3.70 | 5.55 | 6.78 | 2.33 | 4.64 | 6.96 | 8.50 | 4.66 | 9.30 | 13.96 | 17.05 | 7.01 | 13.99 | 21.00 | 25.65 |
| 261-280 | 1.99 | 3.98 | 5.97 | 7.29 | 2.50 | 4.99 | 7.50 | 9.15 | 5.02 | 10.02 | 15.04 | 18.37 | 7.56 | 15.08 | 22.64 | 27.65 |
| 281-300 | 2.13 | 4.26 | 6.39 | 7.80 | 2.68 | 5.35 | 8.03 | 9.80 | 5.36 | 10.74 | 16.12 | 19.68 | 8.11 | 16.18 | 24.29 | 29.66 |
| 301-320 | 2.27 | 4.54 | 6.81 | 8.31 | 2.86 | 5.70 | 8.56 | 10.44 | 5.75 | 11.46 | 17.21 | 21.00 | 8.66 | 17.27 | 25.93 | 31.66 |
| 321-340 | 2.41 | 4.82 | 7.23 | 8.82 | 3.04 | 6.06 | 9.09 | 11.09 | 6.11 | 12.18 | 18.29 | 22.31 | 9.21 | 18.37 | 27.58 | 33.67 |
| 341-360 | 2.55 | 5.10 | 7.65 | 9.33 | 3.22 | 6.41 | 9.63 | 11.74 | 6.47 | 12.90 | 19.37 | 23.63 | 9.76 | 19.46 | 29.22 | 35.67 |
| 361-380 | 2.69 | 5.38 | 8.07 | 9.84 | 3.39 | 6.77 | 10.16 | 12.39 | 6.83 | 13.62 | 20.45 | 24.95 | 10.31 | 20.56 | 30.86 | 37.67 |
| 381-400 | 2.83 | 5.66 | 8.49 | 10.35 | 3.57 | 7.12 | 10.69 | 13.04 | 7.19 | 14.34 | 21.53 | 26.26 | 10.86 | 21.65 | 32.51 | 39.68 |

- On all loose floor work double fin and parting values. -

*Table 1, the standard data sheet. Fin and sand are the variables that produce the greatest degree of fluctuation.*

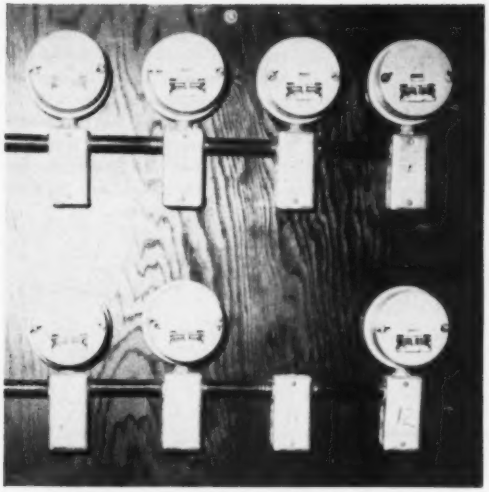


*Fig. 5 . . . Minute counters are mounted on one panel.*

the casting and were the same as that used for handling welded castings. The removal of burnt sand and extra heavy fin was the most difficult to study and classify. The time for removing any burnt sand or scabs was recorded separately in the study by the time study observer. The time for removing extra heavy fin was also kept separate. The question of what was heavy fin over and above the normal amount expected was left up to the judgment of the time study man and the head of the inspection department.

After the allowances in the study for heavy fin had been pace rated and fatigue allowances applied, the normal allowance for the given length of fin was deducted and the difference was plotted. After the curves were drawn, a definite ratio was seen to exist between the amount of extra fin as against the total potential fin and the weight of the casting. To simplify the fin allowance table, a factor was used to classify the fin into one of three classes. This factor was determined by dividing the total potential fin on the casting by the casting weight. Any light casting with a large amount of potential fin would have a higher factor than a heavy casting with a small amount of potential fin and would in return receive a higher fin allowance if one was needed. The writer wishes to point out the very few castings require an additional fin allowance and if they do, it is authorized only by the standards department. Whenever any extra fin allowances are added, the standards department examines all pattern equipment to see if improvements could be made and the fin allowance removed on the next run. The allowances for removing burnt sand and scabs were pace rated and fatigue allowances added, and then they were plotted in the same manner as the extra fin allowances. The burnt sand that appeared did show some relation to the casting weight, but on the whole, it was caused by variables such as casting design, pouring temperatures, gating and heading, wet cores, etc. Four classes of sand allowances were determined under

| Length | Brackets Angle 0-4" | Brackets Angle 4-8" | Brackets Straight 0-4" | Brackets Straight 4-8" |
|---|---|---|---|---|
| 0- 1" | .23 | .31 | .20 | .28 |
| 1.1- 2" | .48 | .74 | .41 | .63 |
| 2.1- 3" | .74 | 1.16 | .62 | .98 |
| 3.1- 4" | 1.00 | 1.59 | .83 | 1.33 |
| 4.1- 5" | 1.26 | 2.01 | 1.03 | 1.68 |
| 5.1- 6" | 1.52 | 2.44 | 1.24 | 2.03 |
| 6.1- 7" | 1.77 | 2.86 | 1.45 | 2.38 |
| 7.1- 8" | 2.03 | 3.29 | 1.66 | 2.73 |
| 8.1- 9" | 2.29 | 3.71 | 1.86 | 3.08 |
| 9.1-10" | 2.55 | 4.14 | 2.07 | 3.43 |
| 10.1-11" | 2.80 | 4.56 | 2.28 | 3.78 |
| 11.1-12" | 3.06 | 4.99 | 2.49 | 4.13 |
| 12.1-13" | 3.32 | 5.41 | 2.69 | 4.48 |
| 13.1-14" | 3.58 | 5.84 | 2.90 | 4.83 |
| 14.1-15" | 3.83 | 6.26 | 3.11 | 5.18 |
| 15.1-16" | 4.09 | 6.69 | 3.32 | 5.53 |
| 16.1-17" | 4.35 | 7.11 | 3.52 | 5.88 |
| 17.1-18" | 4.61 | 7.54 | 3.73 | 6.23 |
| 18.1-19" | 4.86 | 7.96 | 3.94 | 6.58 |
| 19.1-20" | 5.12 | 8.39 | 4.15 | 6.93 |

| Area | Heads or Gates Reg. | Heads or Gates Irreg. |
|---|---|---|
| 0- 1" | .45 | .57 |
| 1.1- 2" | .94 | 1.32 |
| 2.1- 3" | 1.44 | 2.06 |
| 3.1- 4" | 1.93 | 2.81 |
| 4.1- 5" | 2.43 | 3.55 |
| 5.1- 6" | 2.92 | 4.30 |
| 6.1- 7" | 3.42 | 5.04 |
| 7.1- 8" | 3.91 | 5.79 |
| 8.1- 9" | 4.41 | 6.53 |
| 9.1-10" | 4.90 | 7.28 |
| 10.1-11" | 5.40 | 8.02 |
| 11.1-12" | 5.89 | 8.77 |
| 12.1-13" | 6.39 | 9.51 |
| 13.1-14" | 6.88 | 10.26 |
| 14.1-15" | 7.38 | 11.00 |
| 15.1-16" | 7.87 | 11.75 |
| 16.1-17" | 8.37 | 12.49 |
| 17.1-18" | 8.86 | 13.24 |
| 18.1-19" | 9.36 | 13.98 |
| 19.1-20" | 9.85 | 14.73 |
| Over 20" | Reg-20 plus (.495 x area) | |
| Over 20" | Irreg 20 plus (.745 x area) | |

| Casting Weight | * Mtl. | Sand Allowance Light | Sand Allowance Med. | Sand Allowance Hvy. | Sand Allowance Ex-Hvy | * Fin Allowance Factor 0-1.00 | 1.01 3.00 | 3.01-Up |
|---|---|---|---|---|---|---|---|---|
| 0- 25# | .36 | .20 | .42 | .65 | 1.55 | .25 | 2.16 | 3.24 |
| 26- 50 | .56 | .40 | .84 | 1.47 | 2.63 | .88 | 2.46 | 4.04 |
| 51- 75 | .77 | .60 | 1.26 | 2.11 | 3.71 | 1.14 | 2.76 | 4.40 |
| 76- 100 | .98 | .80 | 1.69 | 2.49 | 4.78 | 1.38 | 2.95 | 4.76 |
| 101- 125 | 1.18 | .99 | 2.10 | 3.38 | 5.86 | 1.63 | 3.37 | 5.11 |
| 126- 150 | 1.39 | 1.19 | 2.52 | 4.02 | 6.93 | 1.88 | 3.68 | 5.47 |
| 151- 200 | 1.69 | 1.48 | 3.14 | 4.96 | 8.53 | 2.25 | 3.98 | 6.00 |
| 201- 300 | 2.31 | 2.08 | 4.40 | 6.88 | 11.75 | 3.00 | 5.04 | 7.07 |
| 301- 400 | 3.14 | 2.87 | 6.08 | 9.45 | 16.05 | 4.00 | 6.25 | 8.50 |
| 401- 500 | 3.96 | 3.66 | 7.76 | 11.98 | 20.35 | 5.00 | 7.46 | 9.93 |
| 501- 600 | 4.79 | 4.45 | 9.44 | 14.53 | 24.65 | 6.00 | 8.68 | 11.36 |
| 601- 800 | 6.03 | 5.63 | 11.96 | 18.35 | 31.10 | 7.50 | 10.50 | 13.50 |
| 801-1000 | 7.68 | 7.21 | 15.32 | 23.45 | 39.70 | 9.50 | 12.93 | 16.36 |
| 1001-1250 | 9.53 | 8.99 | 19.10 | 29.19 | 49.38 | 11.75 | 15.66 | 19.58 |
| 1251-1500 | 11.59 | 10.96 | 23.30 | 35.56 | 60.13 | 14.35 | 18.69 | 23.15 |
| 1500-Up | 13.66 | 13.93 | 29.60 | 45.13 | 76.25 | 18.00 | 21.73 | 26.72 |

*Use for handling welded castings

* Factor = Total Potential Fin / Weight of Casting

| Nails Buttons & Rods Rd or Sq | Std. |
|---|---|
| Scab --- | .05 |
| 1/4 to 3/8 | .10 |
| 7/16 to 5/8 | .25 |
| 11/16 to 7/8 | .50 |
| 1- to 1-1/8 | .75 |
| 1-1/4 to 1-1/2 | 1.25 |

| Punch Holes Rd. or Sq. | Std. |
|---|---|
| 0-1" | .08 |
| 1-1/8-1-1/4" | .10 |
| 1-5/8-2" | .13 |
| 2-1/8-2-1/4" | .16 |
| 2-5/8-3" | .20 |

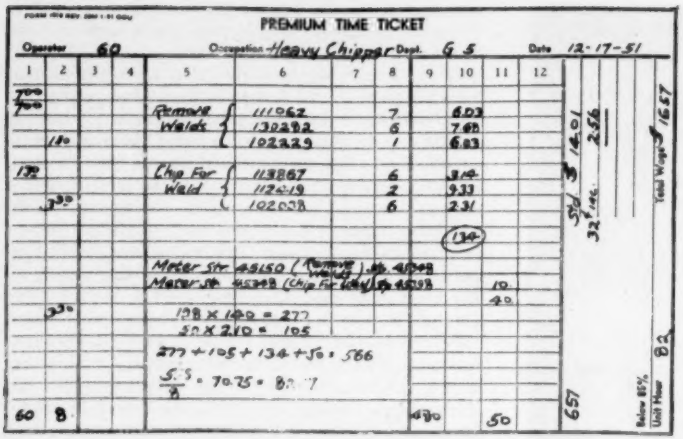
| Chill Prints Perim. | Std. |
|---|---|
| 0-10 | .20 |
| 11-20 | .51 |
| 21-30 | .81 |
| 31-40 | 1.11 |

| Blade Vents Length | Width 1/8 | Width 1/4 - 1/2 |
|---|---|---|
| 0---1/2 | .07 | .10 |
| 5/8-1 | .09 | .15 |
| 1-1/8-1-1/2 | .12 | .22 |
| 1-5/8-2 | .18 | .29 |

| Core Wires Dia. | Std. |
|---|---|
| 1/8 | .20 |
| 1/4 | .30 |
| 1/2 | .40 |

1. K. O. Chills - (Sm -.25)ea.
   " " " - (Lg -.50)ea.
2. Chip & Grind Chaplet Pad Inside Valves ------ 50% Additional
3. Chip Out Chaplet Stem --.2¢

*Table 2, accessory standards covering such items as removing brackets, heads, or gates, core wire, chill prints, etc.*



PREMIUM TIME TICKET

Operator 60 Occupation Heavy Chipper Dept. G 5 Date 12-17-51

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 700 | | | | | | | | | | | |
| 700 | | | | Remove Welds | 111062 | | 7 | | 6.03 | | |
| | 10 | | | | 130282 | | 6 | | 7.65 | | |
| | | | | | 102329 | | 1 | | 6.83 | | |
| 132 | | | | Chip For Weld | 113867 | | 6 | | 3.40 | | |
| | 330 | | | | 112419 | | 2 | | 9.33 | | |
| | | | | | 102038 | | 6 | | 2.31 | | |
| | | | | | | | | | (134) | | |
| | | | | Meter Str 49150 (Remove Welds) Job 49048 | | | | | | | |
| | | | | Meter Str 45393 (Chip For Weld) Job 45038 | | | | | | 10 | |
| | 330 | | | 198 X 100 = 277 | | | | | | 40 | |
| | | | | 50 X 210 = 105 | | | | | | | |
| | | | | 277 + 105 + 134 + 50 = 586 | | | | | | | |
| | | | | 5.5 / 8 = 70.75 = 8 7 | | | | | | | |
| 60 | 8 | | | | | | | 480 | | 50 | |

Std. 14.01 Exp. 2.56 Total Wage $ 16.57

657 Below 85% Unit Hour 82

*Fig. 6 . . . Finished check sheet showing method of payment to operator for removing welds and chipping out for weld. Numbers at top of vertical columns represent the following: 1, Start; 2, Stop; 3, Work Day; 4, Delay; 5, Type of Work; 6, Pattern Number; 7, Part Number; 8, Pieces; 9, On Standard; 10, Unit Standard; 11, Exp. Units; 12, Plus Standard.*

each weight bracket. The classification of light sand, medium sand, heavy sand, and extra heavy sand were drawn so as to cover all the existing burnt in sand and scab conditions encountered in the studies.

The use of the sand allowance and fin allowance table is determined by the *Time Study Department only*. It is up to the time study engineer to keep in contact with all questionable castings and decide which sand allowance and fin allowance is needed if any. He must follow further and see if the condition of the casting can be improved so that the extra fin and sand allowances can be removed. Any casting with more extra work than can be covered by the sand or fin allowance table will not be chipped on direct standards. Instead, the casting will be handled as a welded casting with payment determined from the meter reading and a handling allowance. However, castings that can not be covered by the chipping tables are in the minority, and everything possible is done to correct the condition when it does occur. Following castings through the cleaning room to determine their condition requires on the average from two to three hours work every day by the time study engineer, but it is time well spent as it keeps the chipping operations practically 100 per cent on direct standard and also enables the time study department to recommend methods improvements.

Although many methods were tried and many hours of labor were computed before the final results were obtained for determining standard for rough chipping and removing welds, the numerous advantages are a definite asset.

(1) Operators are rewarded in direct proportion to their individual effort.

(2) The cleaning room foremen can control and allocate their backlog of work.

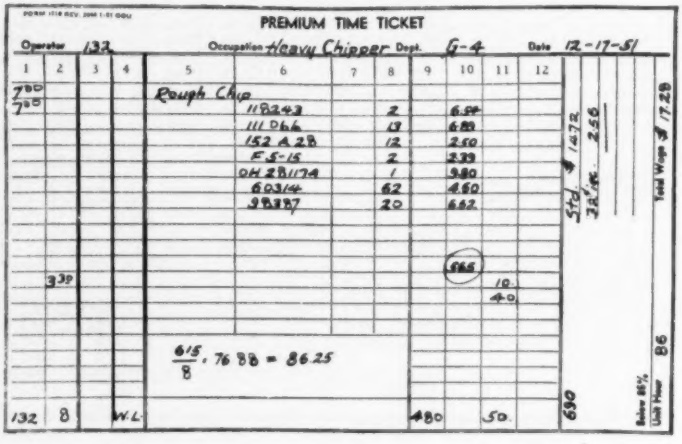
(3) Chipping operations are no longer the bottleneck of the cleaning department.

(4) Actual direct chipping costs and weld removal costs per pound can be tied directly to each casting.

(5) Progress on new operators can be seen at a glance.

(6) Poor methods and costly operations can be detected easily and steps taken to correct them.

Today, more than ever, the modern foundry needs a tool that will accurately measure operator effort with a minimum of supervision and checking if it is to take advantage of any improvement in costs.



PREMIUM TIME TICKET

Operator 132 Occupation Heavy Chipper Dept. G-4 Date 12-17-51

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 700 | | | | Rough Chip | | | | | | | |
| 700 | | | | | 118243 | | 2 | | 6.58 | | |
| | | | | | 111044 | | 13 | | 6.85 | | |
| | | | | | 152 A 28 | | 12 | | 2.50 | | |
| | | | | | F-5-15 | | 2 | | 2.33 | | |
| | | | | | OH 28/174 | | 1 | | 9.80 | | |
| | | | | | 60314 | | 62 | | 4.60 | | |
| | | | | | 98387 | | 20 | | 6.62 | | |
| | | | | | | | | | (66.5) | | |
| | 330 | | | | | | | | | 10 | |
| | | | | | | | | | | 40 | |
| | | | | 615 / 8 . 76 88 = 86.25 | | | | | | | |
| 132 | 8 | | WL | | | | | 480 | | 50 | |

Std. 12.72 Exp. 2.56 Total Wage $ 17.28

690 Below 85% Unit Hour 86

*Fig. 7 . . . Finished check sheet showing method of payment to operator for rough chipping of castings. Code numbers at top of vertical columns represent the same as in Fig. 6, at top of page. 1, Start; 2, Stop; 3, Work Day; 4, Delay; 5, Type of Work; 6, Pattern Number; 7, Part Number; 8, Pieces; 9, On Standard; 10, Unit Standard; 11, Exp. Units; 12, Plus Standard. Although all columns have not been filled in, the premium time ticket gives a fairly accurate picture of what was accomplished by this worker during his work day. Tickets of this nature are almost a necessity in obtaining maximum benefit from a standards determination program of the sort outlined here.*

Convention Preprint ★

# Ventilation at non-ferrous melting and pouring operations

HERBERT J. WEBER / *Chief Industrial Hygienist, American Brake Shoe Co., Chicago*

*Some reasons why ventilation of furnace and pouring operations is essential are presented. These are based on experiences with litigation cases, with occupational disease such as lead poisoning, and with labor relations.*

*The incidence of lead poisoning founded on experimental studies of the solubility of lead oxide in body fluids is briefly treated in its relationship to melting and pouring operations as compared to others.*

*Atmospheric concentrations of lead characteristic of these operations are reported on the basis of actual analyses of numerous air samples collected at the breathing zone of foundry workers.*

*Costs, practical applications, and deficiencies of typical exhaust ventilation for melting and pouring operations are described and illustrated by photographs of equipment in actual operation.*

*The results obtained so far indicate that a favorable solution of the problem has been found.*

*The examples given herewith of methods of exhausting typical non-ferrous pouring and melting operations have been found effective and practical. They are relatively cheap measured in terms of the factors pointed out previously in this paper.*

■ In treating a topic of this type, if the author were a foundry manager, he would first want to know why it was necessary to ventilate melting and pouring operations, whether the plant can afford ventilation, and what proposed methods were practical for his particular operation.

There are several reasons why these operations should be exhausted. First of all, there is the selfish one of protecting oneself against financial losses due to awards made in cases of compensation. A single $5,000 award plus the cost of litigation can pay for a lot of ventilation. During the many times the author has testified in such cases, he has found that the chances of winning are far greater if a process is ventilated. If one has no ventilation or exhaust hoods, it is very difficult to prove that the claimant was not severely exposed to toxic fumes even though, for example, his blood and urinary lead level were within normal limits.

## A Typical Case

Not long ago a certain man died of uremic poisoning. When he first became ill his family physcian was called in and he diagnosed the case as lead intoxication because the man worked in a brass foundry. He was taken to a local hospital and the physician's diagnosis was entered in the record. Later the patient became comatose because of his kidney condition and he was transferred to the veterans' hospital where he died.

The death certificate stated that the primary cause of death was uremic poisoning and the contributory cause lead poisoning.

The company lost this case before the referee and an award was granted for $5,000.00. On appeal the decision was reversed because it was possible to demonstrate that atmospheric exposure to lead was safe as proved by air samples and by blood and urine analyses for lead over a period of many years.

Then too, there is another cogent reason for ventilating. State agencies are requiring it in their health and safety codes and one will be forced to exhaust melting and pouring operations anyway, perhaps at a time when the budget would be very strained to do so.

It is far better for industry to take the initiative in this matter and to do the job gradually as funds permit rather than to procrastinate until intolerable laws put the smaller operator, at least, out of business.

If this seems to be exaggerated, the author merely states in passing that smog control ordinances are becoming so strict that he doubts if the small operator can stay in business. To get a permit to build a foundry in Los Angeles County, you would need to install a collector on the cupola. One guaranteed to meet the Smog Control Ordinance will cost between $60,000 and $80,000, and the anticipated annual maintenance cost for filter replacement is $12,000 for a single cupola

It may be of further interest to mention that claims for occupational loss of hearing are springing up all around us much like the old silicosis cases, and the average claim paid in New York State amounts to $1,000 per case.

Thus we can look for more stringent health and safety codes, not a relaxation of the present ones, and it behooves the industry to take care of its own problems of ventilation in a practical manner now so as to avert passage of intolerable codes later.

There is also the intangible reason for installing ventilation—the personnel one. It is hard to measure this in dollars but it is becoming increasingly difficult to attract good men to the foundry.

After we installed exhuast hoods and ventilating systems in our foundries, we received many expres-

**Preprint No. 52-68.** This paper will be presented at a Safety and Hygiene and Air Pollution Session of the 56th Annual Meeting, American Foundrymen's Society, at Atlantic City, N. J., May 1-7, 1952.

*Fig. 1 . . . Crucible is shown here without any cover.*

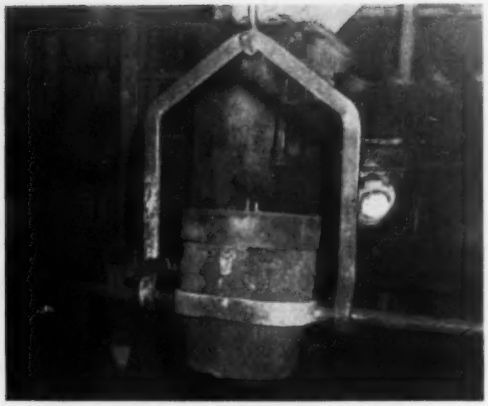


*Fig. 2 . . . Crucible with cover. Note absence of fume.*

sions of appreciation from our men and some of them told the author it was the best thing the company ever did for them. A satisfied employee will usually give a dollar's worth of work for a dollar. The very fact that one installs an exhaust hood is proof to him that management has his interest and well being at heart.

Finally there is the most important reason for installing exhaust ventilation—the moral one. When a man comes to us free of occupational disease, it is our moral responsibility to him to see to it that when he leaves our employment he does so just as symptom-free as when he came to us.

It is economically unsound to lose a skilled man or to have him off sick because of occupational disease even though he does not file a claim; and it is unjust to him since he and his family suffer an economic loss and physical pain. We are in fact punishing a good loyal employee by not protecting his health.

If we had the money, we could replace every furnace, cupola, or machine we have; but we cannot so readily replace skilled talent because it is not as available as machines. The industry has a tremendous investment in its people. It takes years to make a first class molder or melter and we are foolish indeed if we do not protect his health and keep him on the job.

These men cannot be kept free of occupational disease unless melting and pouring operations are ventilated, for the simple reason that the fumes generated by these processes are toxic.

Most non-ferrous work involves the melting of copper, tin, manganese, zinc, aluminum and lead. There are certainly others such as silver, cadmium, and so forth. In the author's experience, lead is the principal and most toxic one. It is capable of producing both the acute and chronic forms of lead intoxication; it is cumulative, especially where there is pre-existing kidney impairment; and it can cause permanent damage to the body.

In our experience, concentrations of lead below 1.5 milligrams per 10 cubic meters of air are safe for all persons during a lifetime of exposure. Atmospheric concentrations up to 3.0 milligrams per 10 cubic meters of air are safe for all but susceptible persons.

*Fig. 3 . . . Fume-diverting ell is bolted to tripod.*

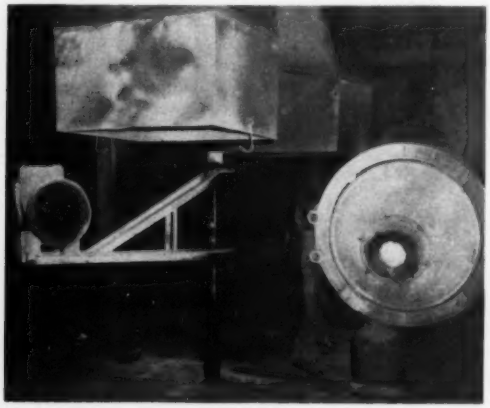


*Fig. 4 . . . Same ell hung on pivot in pour-off position.*

*Fig. 5 . . . Ell here is shown in the melting position.*

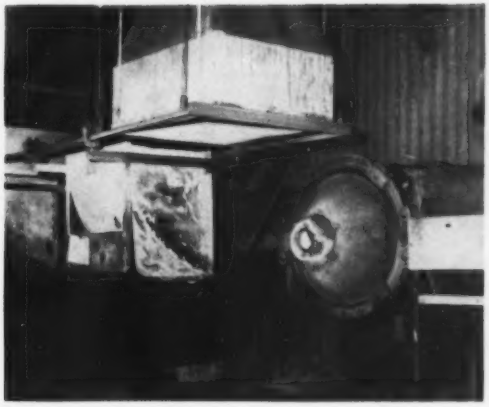


*Fig. 6 . . . Fume baffle suspended on overhead rail.*

Concentrations much in excess of 3.0 milligrams may produce episodes of lead poisoning in any person. When one considers that a milligram is equal to 1/2500th of an ounce, it can be understood that we are dealing here with minute amounts of lead.

Melting and pouring operations are far more hazardous than machining or cleaning jobs for two reasons. First the particle size of lead fume is one-half micron and less. Secondly, the fume is evolved as lead oxide which is very soluble in body fluids. Thus the particle is so small that it is not strained out by the filtering action of the respiratory tract, and the size and solubility product are conducive to rapid absorption into the body.

The particle size in machining and cleaning operations ranges from ½ to about 100 and averages about 12 microns. Further, the lead is present as elemental lead which is not as soluble as lead oxide.

In a study which we made over a five-year period some time ago we found some interesting facts. The men in the machine shop were exposed to an average atmospheric concentration of lead dust of 4.90 milligrams per 10 cubic meters of air, and the men in the furnace bay were exposed during the same period to 4.95 milligrams. Here, intensity and duration of exposure were practically identical. The differences in chemical composition and particle size were as previously mentioned. However, the percentage of men in the furnace bay who suffered episodes of lead intoxication was 57 while in the machine shop only 2.8 per cent of the men had episodes.

These facts indicate that a program of hygienic control should begin with the ventilation of melting and pouring operations, and answer the question why it is necessary to control the fume here.

Can the plant afford to ventilate? The author does not think it can afford not to, if management's thinking is long range and if it intends to stay in business. If the program of control is done gradually by starting with the worst offender, the cost is not too burdensome. Then there are minor things which the plant can do with little or no cost.

If we consider that the ventilating of melting and pouring operations is an air problem and not a fume

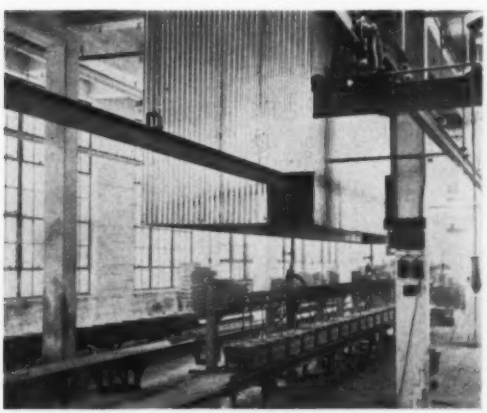


*Fig. 7 . . . Hood over pouring area used with monorail.*

*Fig. 8 . . . Note position of hood as ladle grows empty.*

*Fig. 9 . . . Hood over cupola spout. There are no fumes.*

*Fig. 10 . . . Effect when exhaust fan is turned off.*

problem we have the clue to some simple remedies. How does lead fume get from the crucible, for example, to a point some 20 ft away? Obviously some kinetic energy is imparted to it by the vapor pressure above the molten metal, but this would not transport it very far in a vacuum. However, air currents caused by rising heated air and cross drafts act as convectors for the fume. Now if these convectors can be stopped or controlled we can prevent dispersal of fume.

In transporting a crucible of molten metal from one end of a bay to the other the man at the tail end of the bale is in constant exposure to high concentrations of lead fume. This is true also of a lift truck operator who transports crucibles to pouring stations.

By simply covering the crucible with a garbage can type of cover, we reduced the concentration of lead from 44.6 mg per 10 cubic meters of air to 2.5 mg. These covers can be made by the maintenance man.

Figure 1 shows a crucible without the cover and Fig. 2 shows one with the cover secured in position. By placing a steel lid over the pouring spout of a reverberatory furnace during melting, contamination at the breathing level from this source can be almost entirely eliminated. The cost of this protective lid is negligible.

If bottom pouring is practical in your operation, a crucible or ladle can be kept covered and the amount of fume given off is only a fraction of that produced by the conventional method.

Mention was made previously of controlling air currents. Barrel furnaces discharge fume directly into the breathing zone. To baffle this fume above the breathing zone where it could be removed by overhead ventilators we formerly used a diverting ell as shown in Fig. 3. The ell was bolted to a tripod on casters and moved into position during melting. It was so cumbersome, however, that frequently the men failed to use it. We then installed it on a pivot which made it possible to swing the ell in and out of position very easily. This is shown in Figs. 4 and 5. This type of baffle clogs with slag and unless kept clear, it does little good. As a result we designed the baffle shown in Fig. 6 which can be hung on an overhead

*Fig. 11 . . . Hood over a furnace in melting position.*

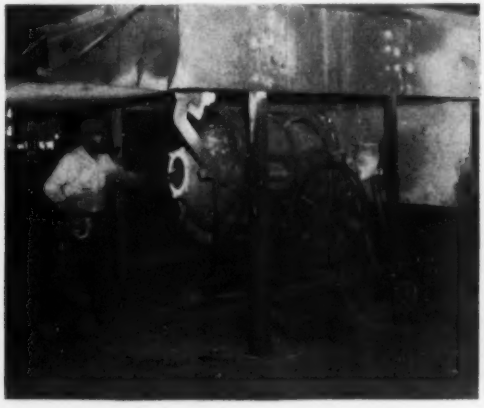


*Fig. 12 . . . Hood over furnace with an ungapped stack.*

monorail as shown or on a pivot. The total cost of one gravity hood and baffle shown in the figure was $1,000.

In production foundries where a monorail can be used a simple hood (Fig. 7) over the pouring area is effective. But in jobbing work or where overhead cranes are used, hoods are not always practical. For this type of operation we have developed a simple hood fitted to the bale and connected by flexible tubing to an overhead exhaust fan which is attached to the crane bridge. This installation blows the fume to overhead ventilators which discharge it to the outside; it reduced the exposure of the pouring crew 65 per cent; and it keeps contamination from reaching the molding areas. The total cost was $300. Figure 8 shows the degree of fume reduction produced by a ladle exhausted in this way.

### Cupola Can Also Contaminate

Another source of great contamination is the cupola, especially during tapping. We have found concentrations of atmospheric lead well in excess of 20 milligrams per 10 cubic meters of air in the tapping areas of cupolas. This is a very severe exposure. By means of a simple hood over the spout shown in Fig. 9, we were able to reduce the atmospheric lead to a concentration in the region of 1.4 milligrams per 10 cubic meters of air—a safe exposure. The cost of this type of hood was $1200. One case of lead poisoning could easily cost as much. The hood is effective, inexpensive, and does not interfere with operation. Furthermore it does not remove a large volume of warm air, which becomes a factor with all exhaust equipment moving large volumes of air especially in the winter time. Figure 10 shows the effect produced when the exhaust fan is turned off.

General roof ventilation in the long run is the most expensive and least effective kind. It generally removes fume after it has been breathed by the workmen. It does serve a good purpose however in that it keeps the general atmosphere diluted, but it does not guarantee that worker A or B is in a safe environmnt. It is more applicable where the contaminant is principally smoke or some other physiologically inert substance. In nonferrous foundries where the fume is apt to be toxic, it should be used as an adjunct to local exhaust ventilation, not as a substitute.

Some codes specify that a foundry should have 20 air changes per hour. This is misleading for nonferrous melting and pouring bays since the air-change cannot easily be distributed in a uniform manner.

In one of our melting bays, we had eighteen 18,000-cfm ventilators in the roof. This is equal to exhausting 19,440,000 cu ft of air per hour and is equivalent to 56 air changes per hour. Yet the average concentration of lead was in the order of 12 milligrams per 10 cubic meters of air. By means of the hoods with gravity stacks shown in Figs. 11, 12 and 13 we reduced the concentration to 2.5 milligrams of lead per 10 cubic meters of air. The costs of these hoods were $1,600, $1,000 and $900 respectively.

One problem we have had with power ventilators is in trying to convince workmen that if they open the windows in the monitor they merely short circuit the exhaust so that little contaminated air is moved from the breathing zone. In one test we collected air samples at various work stations with all the monitor windows closed. We then collected air samples at the identical stations with all of the monitor windows open. In both cases, the power ventilators in the roof were operating. We found a reduction of 31 per cent in the atmospheric contamination at the breathing zone when the windows were closed. This is a very important fact to bear in mind if the furnace and pouring bays are exhausted by power ventilators.

### Use of Floor Gratings

A very effective way of exhausting a furnace bay is shown in Figs. 14, 15 and 16. For this particular bay, fume from the furnaces is directed upward by means of baffles into the gravity hoods (Fig. 14). Fresh outside air is introduced through the floor gratings between each furnace (Fig. 15) at the rate of 60,000 cfm, and overhead ventilators exhausting at the rate of 100,400 cfm keep the bay under vacuum and remove any traces of fume escaping from hoods, ladles, etc. In addition, the charging floor is completely walled off to protect the charging crew, and furnaces are charged by

*Fig. 13...Note cover on pouring spout, lack of fume.*

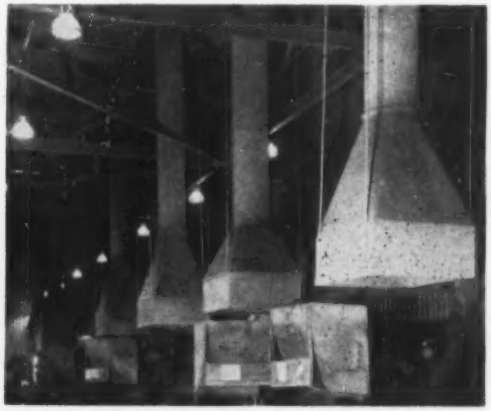


*Fig. 14...Gravity stack and baffles in furnace bay.*

*Fig. 15 ... The floor grating admits fresh air here.*

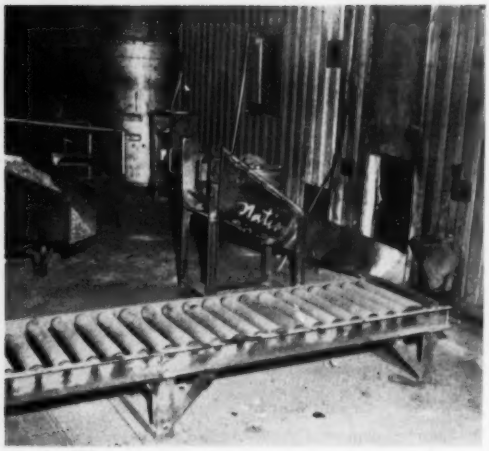


*Fig. 16 ... Charging floor of bay shown in Fig. 14.*

means of chutes (Fig. 16) projecting in the furnace doors proper.

The concentration of lead in air in the bay itself ranges from 0.3 to 1.9 and averages 1.0 milligrams per 10 cubic meters. On the charging floor, atmospheric lead ranges from 0.4 to 1.1 and averages 0.7 milligrams per 10 cubic meters of air. These are safe values, and we have no cases of lead intoxication in this very hazardous department.

Referring to a previous statement that fume control is really a problem in air control, we followed that principle in designing this particular bay.

1. We prevent fume from being carried to the charging floor by walling it off from the bay. This stops the convecting air currents from reaching that area.

2. We control the hot convecting gases issuing from the furnaces by baffling them upward above the breathing level into gravity stacks.

3. We introduce fresh outside air to serve as a convector and diluent for those fumes escaping the hoods or rising from ladles during skimming and pour off.

4. We protect areas outside of the bay by keeping it under vacuum so that the relatively clean air from the molding areas travels toward the bay.

The writer does not believe a furnace bay can be effectively exhausted by overhead ventilators alone unless the furnaces are raised to a height by hydraulic elevators so that the pouring spouts during melting will be about 10 ft above the floor in a low bay—say 25 ft at the peak.

Even the reverberatory type of furnace and the kettle type (examples of which are shown in Fig. 17 and 18) which discharge fume well above the breathing level, in the experienec of our company, require local exhaust hoods.

Pit furnaces or crucible furnaces, as they are often called, are a source of severe exposure to toxic fumes in the melting department. Somtimes it is impractical to use monorail cranes for removing the crucibles from the furnaces so that the more flexible conventional overhead crane may be required which may preclude the use of local exhaust hoods. We were confronted with this problem and solved it in the following way (see Fig. 19 for details).

The floor directly in front of the furnaces was removed and an air tunnel installed. The tunnel was covered with a steel grating as shown in the figure. Baffle plates were suspended at experimental intervals below the grating to get an even distribution of air. Cost of the air tunnel was $3,000.

A fan capable of delivering 25,000 cfm was installed at the far end of the tunnel. This fan brought in fresh outside air and delivered it uniformly through the interstices of the grating. This formed in effect an air curtain at the breathing zone of the workmen, and effectively diluted the fumes to safe concentrations. Overhead ventilators removed the contaminant from the building.

The observed effects were:

1. The fume was blown away from the men and upward. This can be seen to a small degree in the figure by observing the slight deflection of the flames toward the wall.

2. The cooling effect of the cold air on the men made the atmosphere more comfortable.

3. The installation introduced no heating problem, since the overhead ventilators did not remove intentionally heated air but cold outside air.

4. The system offered absolutely no interference with operations, overhead cranes, or production.

Air samples were collected along the floor grating at the breathing level of the workmen, with the air curtain turned off and with it in operation. The samples were collected at the foreground end, the center, and the background end of the grating. The results are as follows:

| Location of Sample Station | Atmosphere Conc. of PbO, mg/10 cm, Air off | Air on | Percentage of Reduction in Concentration |
|---|---|---|---|
| Front | 5.5 | 1.7 | 69.0 |
| Center | 7.5 | 0.7 | 90.0 |
| Back | 5.1 | 0.6 | 88.0 |
| Average | 6.0 | 1.0 | 83.0 |

*Fig. 17 (above) . . . Reverberatory furnace with a gravity stack. Notice flame discharging into the stack.*

*Fig. 18 (above right) . . . Gravity stack for kettle-type furnace. Local exhaust hoods are generally needed even though the fumes are discharged above the breathing level.*

*Fig. 19 (below right) . . . Air tunnel in front of this row of crucible furnaces was built at a cost of $3000. It delivers 25,000 cfm of fresh air to the workers in this area.*

*Fig. 20 (below) . . . Hood over bank of pit furnaces. Note effective removal of all fumes here.*

Convention Preprint ★

# Practical suggestions for the building of wood patterns

W. H. SIEBERT / *Patternshop Foreman, Elyria Foundry Div., Industrial Brown Hoist Corp., Elyria, Ohio*

■ Machine tools are much needed today and the demand for machine tool patterns is great. The large number of castings required for many types of machines coupled with the complexities of modern design challenge patternmakers and foundrymen to strive for better pattern equipment that helps the molder produce more and better castings. Large patterns are quite often thought of in terms of cheap patterns; never can enough emphasis be placed on the fact that a pattern must be built substantially, and to foundry requirements.

Therefore it seems only common sense to use the ideas which follow. Even if a pattern is to be made for only one casting, they still hold true.

### Not Just Guesswork

To produce a satisfactory pattern we must teach young men that there is more to modern patternmaking than merely haphazard guesswork as to how a good pattern should be built. The patternmaker of today must be able to visualize everything that goes into the making of a large piece of equipment. In order to do this he must have a working knowledge of a designer, a machinist, and above all a molder and coremaker, so that with the close cooperation of these men plus skilled know how, he may achieve the final result of a usable pattern.

In this report we would like to confine ourselves to the construction of a pattern that will make a casting for a specific large machine tool casting. This casting is a typical example of the production requirements stated above. The large number of castings required makes it mandatory to engineer this equipment to provide the foundry with a pattern that enables mold after mold to be made with a minimum of effort, and to construct the pattern in such a way as to avoid delays for repairs as much as possible.

With this in mind, we suggest a few details of making such a pattern. The first step should be to become thoroughly familiar with what the designer is trying to achieve, determining the finished surfaces most critical, dimensions most critical, oil or water tight compartments, etc. These facts may help in determining the best possible surface to have in the drag, and perhaps in arranging the cores in such a manner as to do away with the need of chaplets where a leak proof casting surface is required.

This accomplished, the next step should be to consult the foundryman who is to make the casting. It would indeed be a costly error to neglect this all-important step. Assuming that he has to produce 50 good castings, he will be of utmost value in helping design the pattern so that he will be able to make these castings to the best satisfaction of the customer and meet a reasonable time schedule. His advice will be an important factor in determining molding methods, flask sizes, sufficient core supports, core vents, risers, and gates. Most of all he will aid in designing the cores to enable him to set them without costly delay. His core oven capacity may be a factor in determining the size of the cores. In places where two cores are separated by a wall section, it is sometimes possible to make these two cores into one simply by one or two permissible holes through this wall section. The saving is quite obvious. There is one less core box to make, one less core, and one less set for the molder. Perhaps one of the more common applications for adding holes is on large cope surfaces where ordinary chaplets are either objectionable or impractical. The molder very often insists on them. In cases where the cope side of the mold is also the bottom of a machine that has tanks and other compartments incorporated in the design, openings, if held to a proper diameter, can be welch plugged in the machine shop and will prove quite satisfactory. It is very beneficial to the molder to have as many holes as possible in the cope surfaces, for they afford an excellent place for venting out core gases and prevent any possibility of cores raising to the cope.

After proper planning, and after all necessary layouts have been made (normally a typical cross section) begin construction of the pattern. The first concern must be the frame work, or heads. These must be set up on an absolutely flat surface. If it is desired to have a pattern that is accurate, all precautions must be observed from the very beginning.

Use this hard and fast rule in selecting lumber: do not skimp on thickness. Patternmakers must bear

**Preprint No. 52-64.** This paper will be presented at a Patternmaking Session of the 56th Annual Meeting, American Foundrymen's Society, at Atlantic City, N. J., May 1-7, 1952.

in mind that the modern foundry employs slingers for ramming, which are quite capable of bowing a 1⅛ in. pattern lagging enough to render a draw impossible. Therefore heads must be sturdy. Sixteen in. should be the maximum spacing of heads.

After all the heads are erected, tie rails are placed. This is best accomplished by screwing them directly to the outside of the heads. It is the author's opinion that the common practice of recessing the rails into the heads tends only to weaken the head structure. This is a frequent cause of serious pattern damage. The rails should be at least 1¾ x 6 in., so placed that the outer lagging can be fastened to them with the grain of the wood following the draw of the pattern.

However, before the outer lagging can be applied, enough inner cross bracing must be installed to insure a rigid pattern. Good judgment must be employed in this so as not to increase the weight of the pattern excessively. To facilitate bolting or screwing of rapping or vibrator plates to the pattern, sufficient stock must be placed at proper locations between the heads.

Next in line is the matter of draw straps, which also should be installed before any lagging is applied. These straps should consist of at least 2½ x ¼ in. cold rolled steel. They should be hooked to the heads and bolted for maximum strength. These straps should be kept flush with the face of the pattern, and not project above as is so often the case. A 1-in. hole drilled in this steel strap will serve for handling purposes. If the pattern is to be rolled with the flash, handling holes must also be provided both on the cope and drag side of the pattern. Hooks should be flush with the pattern surface.

### Now Enclose the Pattern

Now proceed to finish enclosing the pattern. If possible use 1⅜ in. stock for lagging, as it will help strengthen the job and avoid bowing by the slinger. These laggings can either be nailed or screwed to the rails. Consider at this point all external parts of the pattern, such as core prints, bosses, large round corners, fillets, etc. These may well be incorporated in plans for lagging.

Avoid loose pieces where possible. If this is impossible, it is best to fasten them to a dovetail. Pieces attached with loose pins often are rammed off their particular location.

It is very difficult to remove large, loose pieces. In order to aid the molder in producing a better mold, quite often loose pieces can be made in ram-up cores. This will aid greatly in finishing the mold, as the hard-to-get-to places are already blackened on the ram-up core in the core room.

Coreprints should be sufficiently large to carry the weight of the core and permit solid anchorage. In the event the core must be tied down in the mold, enough space must be given on the face of the coreprints to permit the coremaker to provide the proper tie rods.

The patternmaker must also be mindful of print sizes to prevent the possibility of the molder placing a core in the wrong print or of placing a core wrongly in its own print. He uses core markers where necessary, and makes them large and distinct. A patternmaker should work on the assumption that if a molder can err in locating a core, it is the fault of the pattern design.

Pattern draft is of course of prime importance; lack of it may cause needless patching. Usually 3/16-in. draft for every two feet of pattern surface is sufficient on any side surface. However, a good practice is to have all the draft that the part design will permit. If it becomes necessary to have recesses in the cope surface of the pattern, use as much draft as possible. The lack of sufficient draft is perhaps the most common error a patternmaker will make.

The construction of coreboxes requires as much consideration as the pattern itself. It should likewise be considered from the foundry angle. An important factor to the coremaker is the outer shape of the corebox. No matter what shapes or angles the core itself may take, the box should always be started as a rectangular frame of sturdy construction. That is the easiest shape to roll over and draw. The sides should be of 2-in. stock with a ¼-in. gaining in of the ends. The bottom can be made of thinner stock, depending on the size of the box.

Since the core may take many shapes, and incorporate large bosses, ribs, etc., the patternmaker must try to picture in his mind what the coremaker has to do to make the core. Good judgment may save needless work. It is often impossible to ram under large, loose pieces. In such instances, make it possible for the coremaker to sweep up a flat surface under the loose piece. This can often be accomplished by making the box one inch wider per side and adding 1-in. stock up to the level of the loose piece. This will serve a twofold purpose. First it will provide a seat for the loose piece; second, it will furnish a surface on which a sweep will ride to establish the lower level of the loose piece. After the coremaker has swept this sur-

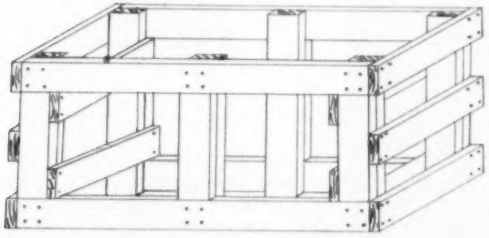


*Fig 1 . . . Illustrating proper construction method for heads. Frame must be set on an absolute flat surface.*

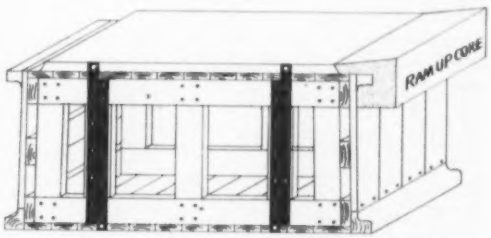



*Fig. 2 . . . Section of completed pattern, showing proper use of ram-up cores. Notice use of draw straps.*

face, he has only to set the loose piece on it and finish the ramming operation.

It is also wise to remember that large cores may settle, thus making the side larger and subsequently giving the molder thinner metal walls. This can be avoided by making the box smaller than the actual measurements. It is good practice to make the inside dimensions of the corebox with the standard rule. As in many foundry practices, no hard and fast rules are applicable. It is good to discuss with the foundry such cases where cores are exceptionally high or large. In case a patternmaker must use his own judgment on such cores, 1/16 in. per foot of width and length may be deducted from the actual size where cores are more than 2 feet high, using the shrink rule. A standard rule may make core slump allowances too great on larger cores. It is, of course, the height factor that more than anything else causes core growth.

Too little attention is often given to the outer shell of the box. A good battening job helps preserve it. Remember the box plus sand, core rods, and core plate is a lot of weight to roll over. This in itself is a good reason to make the core box as strong as possible. Never glue and nail battens; screw them on.

Now that the pattern and boxes are completed, there remains one more thing to do. After proper application of a pattern coating, mark up the equipment in such a way that the foundry has no trouble in setting up the job. This identification can best be accomplished by using embossed zinc tape; painted-on setups are soon rendered unreadable by service.

Successful completion of a pattern often can only be accomplished by cooperation among all involved. Design, patternshop, foundry, and coreroom all play an important part in pattern engineering. By utilizing all these resources, the patternmaker can produce a pattern that will stand up under the roughest treatment and yet turn out casting after casting which meet the highest quality standards.

It would be embarrassing to have a pattern come out of a mold in pieces. Equal embarrassment can result if the foundryman declares that the already constructed pattern can't be used unless a costly rebuilding job is done. Several factors can contribute to a faulty pattern. First, there is a lack of foundry knowledge on the part of some manufacturers of patterns. Second, in cases where the purchaser specifies a well-made pattern, the producer may deliberately slight the construction in order to save expenses. Third, purchasers of patterns may allocate an insufficient amount of money for the cost of a pattern, causing the same bad results. It seems false economy to make the price of a pattern the most important factor and then build the pattern to suit this price. The resulting cheaper pattern would have a decidedly shorter life. Such a pattern could quickly cost many additional dollars for rebuilding and repair costs and down time.

Pattern manufacturers should strive to build patterns to meet foundry requirements. Following the factors outlined in this paper will lead to strong, serviceable patterns which will cost more but will return this extra expense in castings at less cost per pound. Patternmaking is one of the few highly skilled trades. It should be applied to the fullest extent. This and nothing else leads to successful patternmaking.

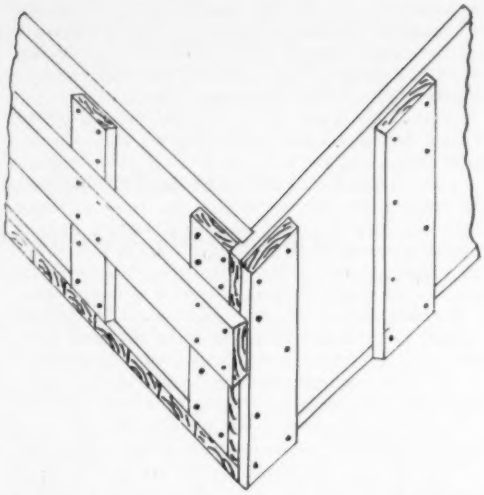


*Fig. 3 . . . Detail of outer construction of core boxes.*

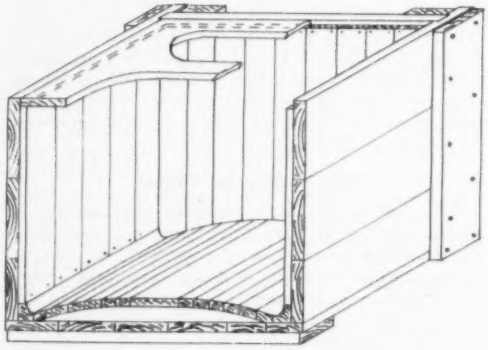


*Fig. 4 . . . Cutaway section of core box showing inner lining. This lining has two purposes; it provides a seat for the loose piece, and it furnishes a surface on which a sweep will ride to establish lower level of piece.*

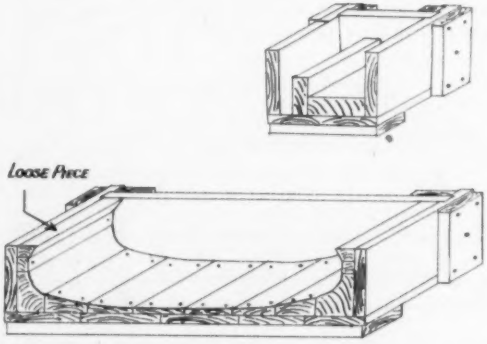



*Fig. 5 . . . Shows construction of ram-up and drag cores.*

# Quality control program for a steel jobbing foundry

H. H. FAIRFIELD / *Chief Metallurgist, William Kennedy & Sons Ltd., Owen Sound, Ontario, Canada*

■ Statistical quality control is a technique of management which has been used successfully in many different types of industries. The Society of Quality Control Engineers has active chapters in most industrial centers. The purpose of this paper is to describe the application of quality control in a jobbing foundry. Our steel foundry produces castings from one pound to five tons in weight. Carbon, alloy, and manganese steels are poured. There are no long production runs; most casting orders range from one to six pieces.

### Metal Quality

The first step in the program was to post all chemical tests, physical tests, melting times, and down times on charts (Fig. 4). This enabled the melters to study the results of their efforts. The second step was to initiate standard statistical quality control charts for physical test results and some chemical tests (Fig. 2 and 3). This enabled the metallurgist to detect "assignable causes" of variation.

(An explanation of this term seems necessary at this point. If a graph is drawn of a test value, carbon content of mild steel for example, there will be shown a variation from heat to heat. A certain amount of variation is unpreventable; it is characteristic of the operation. The melting foreman is anxious to detect any change in procedure. He may make the mistake of looking for trouble when the carbon is within normal limits, or he may fail to notice when carbon has exceeded the normal variation. The function of the quality control chart is to determine mathematically the normal range of variation. When a test value exceeds the normal range, it is assumed that an assignable cause for variation exists. If a process is to be kept under control and steadily improved, it is necessary to investigate each time an assignable cause is detected. In the rest of this report the term "A.C." will be used to indicate this type of investigation.)

The third step was to post a scoreboard at the electric furnaces (Fig. 1). Each melter was rated by the percentage of perfect heats made. Naturally, when the melters were charged with an A.C., they wanted to know the reason why the heat was off standard. Therefore the metallurgical lab had to investigate each A.C. and make a report on it. The quality control program greatly increased the amount of metallurgical work. However, the principle adopted was that we could not mark up an off heat against a melter if we could not

**Preprint No. 52-46.** This paper will be presented at a Steel Session of the 56th Annual Meeting, American Foundrymen's Society, at Atlantic City, N. J., May 1-7, 1952.

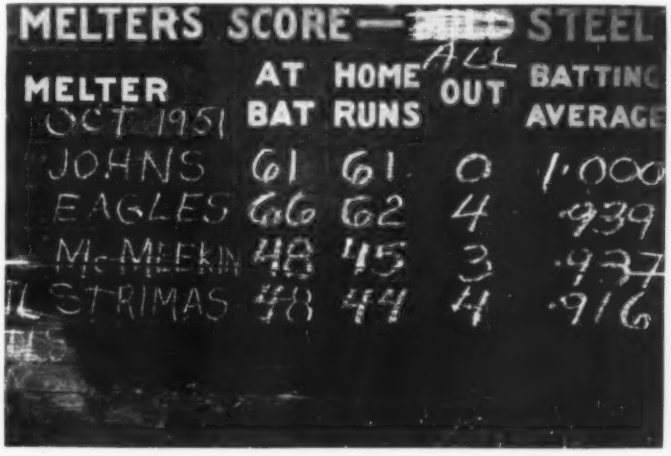



*Fig. 1 . . . Scoreboard at the electric furnaces. Each melter is rated according to the percentage of perfect heats made. Naturally, he is anxious to maintain his record at as high a level as possible. Relative standings lend a competitive air to routine work.*

explain how or why it was off. An A.C. summary is shown in Table 1.

### Assignable Causes

The most frequent A.C. was high or low carbon. The melters pointed out that the lab was too long in completing the carbon test, and that the metal changed while they were waiting for results. In order to overcome this difficulty, a 30-second test was developed which the melter could carry out.[1] This enabled the melters to control carbons more accurately.

The second most frequent A.C. was high or low manganese. As the melters acquired better control over the deoxidizing phase of melting, manganese control improved. Since lack of manganese control resulted in erratic tensile strength, a rapid tensile strength test was developed.[1] This test is carried out by the melter.

In 1948 and 1949, it was evident that the melters could not hold sulfurs within the range 0.10 to 0.15 per cent consistently. This steel was made in a basic furnace. One of the melters developed a method of handling the furnace slag in such a way that sulfurs were brought under control.

Many heats having lowered ductility were found to have Type II inclusions.[2] A decrease in the amount of aluminum from 3 lb to 2 lb per ton seemed to eliminate this trouble. Seven low-ductility heats tested by the Canadian Bureau of Mines showed Type II inclusions and 0.25 to 0.35 per cent copper. It was assumed that non-ferrous metals in the scrap were responsible.

Only a few cases of pinholes were satisfactorily solved. New ladles, green furnace spouts, and wet sand were blamed. The incidence of pinholes has dropped from 1.65 to 0.17 per cent. This is probably due to the present practise of boiling every heat from 0.40-0.45 per cent carbon down to 0.08-0.13 per cent carbon.

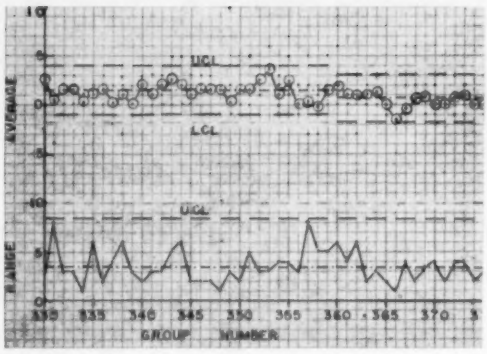



*Fig. 2 . . . Quality control chart for elongation of mild steel. Deviations from Table 2 are plotted here.*

### Metal Quality Improvement

The frequency of assignable causes has dropped from 30 per cent to less than 7 per cent. It is hoped that further improvement can be made. The melting process is not under control in the statistical sense; however, it is tending in that direction. In order to clearly define the role played by quality control in this project it is necessary to analyze the reasons for the

*Table 1 . . . Frequency of assignable causes are below.*

| Assignable Causes | June '48-May '49, per cent | June '49-Oct '51, per cent |
|---|---|---|
| High carbon | 5.05 | 1.9 |
| Low carbon | 4.00 | 1.12 |
| High manganese | 5.30 | 0.85 |
| Low manganese | 3.50 | 0.76 |
| Sulfur in free-cutting steel | 4.00 | 0.32 |
| Type 2 inclusions | 1.70 | 0.06 |
| Pinholes | 1.65 | 0.17 |
| Chromium | 1.25 | 0.53 |
| Unknown | 1.1 | 0.085 |
| Hydrogen flake | 0.93 | 0.13 |
| Sulfur | 0.71 | 0.233 |
| Dirty steel | 0.60 | 0.42 |
| Nickel | 0.38 | 0.042 |
| Phosphorus | 0.33 | 0.042 |
| Woody fracture | 0.165 | 0.042 |

*Table 2 . . . Mild steel elongation and tensile strength.*

| Tensile strength, psi | Elongation, per cent |
|---|---|
| 65,000 | 32.3 |
| 66,000 | 32.0 |
| 67,000 | 31.6 |
| 68,000 | 31.3 |
| 69,000 | 31.0 |
| 70,000 | 30.6 |
| 71,000 | 30.2 |
| 72,000 | 29.9 |
| 73,000 | 29.6 |
| 74,000 | 29.2 |
| 75,000 | 28.9 |
| 76,000 | 28.4 |
| 77,000 | 28.2 |
| 78,000 | 27.8 |
| 79,000 | 27.4 |
| 80,000 | 27.1 |

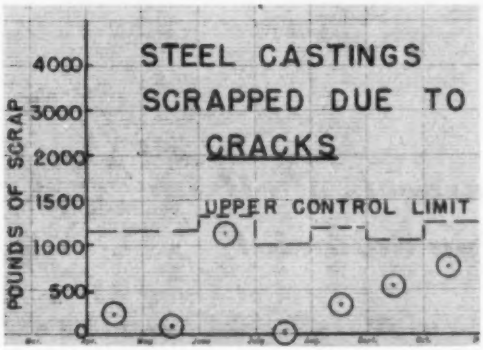



*Fig. 3 . . . Quality control chart for pounds of steel castings found defective due to cracks in them.*

*Fig. 4 . . . Charts of chemical and physical tests are shown here. Similar charts give melting and down times.*

improvement in quality. These reasons are as follows:

1. All test data were displayed so that melters and lab staff were fully informed on melting operations.
2. Each melter was rated monthly according to the per cent of perfect heats made. This rating was posted on the wall.
3. Melters did their best to get a good score. In order to improve their score, they called upon the metallurgical department for information.
4. Melting foremen obtained information pertaining to melting operations from a number of sources.
5. Under the incentive supplied by the quality control program, all of the people involved in the melting operation learned more about the work and did their jobs more efficiently.

*Table 3 . . . Shows fraction defective steel castings.*

| Defect | Fraction Defective | Normal limit pounds of defective casting per month |
|---|---|---|
| Planning errors | .00920 | 7700 |
| Pinholes | .00490 | 4640 |
| Cracks | .00260 | 1748 |
| Dirt | .00200 | 2268 |
| Misrun | .00170 | 1652 |
| Runout | .00115 | 1490 |
| Gas holes | .00089 | 1222 |
| Molding | .00076 | 1110 |
| Shrinks | .00062 | 843 |
| Bad metal | .00058 | 896 |
| Scabs | .00046 | 776 |
| Short pour | .00040 | 700 |
| Wrong metal | .00010 | 320 |
| Burned cores | .00008 | 246 |

Note: Normal limits based on 300 tons per month.

Since the production runs here are short, it is not possible to set up charts for individual castings. A monthly summary of scrap castings is compiled. Data are recorded as in Table 3 and Fig. 2 and 3. When normal ranges are exceeded, corrections are applied.

Quality control methods have not yet been applied to sand control. Some 12 different sand mixtures are prepared daily. This does not mean that 12 separate charts would have to be plotted for quality control purposes. Deviation charts could be used. On the moisture chart, for example, the moisture tests for all mixes would be recorded in terms of deviation from standard. This would show the degree of control exercised by the mixer.

As the castings are poured, the weights are recorded. Since the selling value of each casting is known, it is possible to determine the hours of labor required per $1,000 worth of castings. Charts are maintained and a bulletin posted, showing the man-hours worked per unit of product in each foundry department. The cleaning room is rated according to the value of product shipped. Each foreman therefore knows from week to week his production and efficiency score.

Quality control charts are an excellent medium by means of which workers and management can be made acquainted with factual information concerning manufacturing operations. When a worker finds his own personal performance charted on a graph or listed in a bulletin, he is nearly always motivated to improve his work. Most men are proud of doing a good job, and the control chart enables a man to check his work.

Posting up quality control charts throws extra work on the management. Foremen are called upon to correct conditions which prevent the worker from attaining optimum efficiency. Foremen in turn call upon higher management to improve working facilities.

## Bibliography

1. H. H. Fairfield, H. F. Graham, and A. E. McMeekin, "Metal Composition Tests for the Steel Melter," TRANSACTIONS, American Foundrymen's Society, vol. 58, pp. 530-536 (1950).

2. C. W. Briggs, *Metallurgy of Steel Castings*, (1946), p. 149-150. McGraw-Hill Book Co., New York.

Convention Preprint ★

# Practical aspects of olivine as a molding material

JOHN SISSENER / *President, Norwegian Foundrymen's Association*
BJORN LANGUM / *Foundry Manager, A/S Drammens Jern, Drammen, Norway*

■ Olivine is an iron-magnesium silicate which has been used for years as molding material in the Norwegian foundry industry, especially in the steel foundries. The mineral was first described by J. G. Werner in 1790. The name is due to its green color.

The olivine rocks in Norway belong to the dunites, and contain minor quantities of other minerals like enstatite, magnesium emphibole, and traces of chromite, magnesite, phlogopite and corundum. Some deposits containing serpentine are less suited as molding material. Minor deposits exist as natural sands. The hardness of the mineral is 6.5 to 7 (Moh's scale) and the specific gravity is 3.25 to 3.4.

The deposits are enormous, and open air mining is employed. The rock is crushed and delivered as molding sand. As delivered, olivine has the following approximate composition: 50 per cent MgO, 41 per cent $SiO_2$, 6 per cent FeO, small quantities of $Fe_2O_3$, $Cr_2O_3$, $Al_2O_3$, NiO, MnO, and traces of CoO. Ignition loss is 0.5 per cent.

Sintering point is above 2900 F. Graph 1 shows the system MgO–$SiO_2$ after Bowen-Andersen[1]. Graph 2 shows the system $Mg_2SiO_4$–$Fe_2SiO_4$ after Bowen-Schairer[2]. Olivine may be regarded as a neutral or slightly basic material. The diagrams show that the pure magnesium orthosilicate—"forsterite"— $Mg_2SiO_4$ —is very refractory, but that the refractoriness is considerably less with increasing $SiO_2$ and iron oxides.

The first attempts at using crushed olivine synthetically bonded as a molding sand started in a Norwegian steel foundry in 1927-1928[3]. As olivine was several times more expensive than silica, there was at that time no reason to proceed with olivine as molding material. But in 1938 industrial use of crushed olivine as a molding material for high chromium-nickel steel was successfully tried, and olivine has been used ever since because of the good casting surface produced.

Until 1938 only a few cases of silicosis were known in Norwegian foundries, but in that and the following year many foundry workers were x-rayed. Silicosis was found to such a degree that it called for remedies. Because olivine contains silicon dioxide combined with MgO and in smaller proportions, it was presumed that the risk of using olivine as molding sand was not as great as in using pure silica sand. Based on this presumption, olivine was again introduced as a molding material and has been used since then in Norwegian steel foundries.

In 1940, tests were carried out with rabbits[4]. The rabbits were exposed to silica dust and olivine dust under the same conditions. In England tests were carried out with rats[5] in 1943-1945. In both cases examination of the lungs showed olivine dust to be less dangerous than silica.

After the German occupation the production of suitable crushed olivine as a molding material was in-

| | SAND TYPE | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| | A.F.S. GRAIN FINENESS NUMBER | | | | |
| | 67 | 108 | 132 | 214 | 34 |
| SIEVE NUMBER | PERCENTAGE RETAINED | | | | |
| 6 | - | - | - | - | - |
| 12 | - | - | - | - | 0.5 |
| 20 | 9.5 | 0.5 | 1.5 | - | 24.0 |
| 30 | 12.5 | 2.5 | 3.0 | - | 16.5 |
| 40 | 16.0 | 3.0 | 2.5 | - | 17.0 |
| 50 | 16.0 | 6.0 | 3.5 | - | 18.5 |
| 70 | 17.0 | 15.5 | 10.5 | 6.0 | 15.0 |
| 100 | 10.5 | 24.5 | 21.0 | 9.5 | 5.0 |
| 140 | 7.0 | 19.0 | 14.5 | 10.0 | 2.0 |
| 200 | 2.5 | 13.0 | 13.5 | 11.0 | 0.5 |
| 270 | 1.5 | 5.5 | 14.0 | 12.0 | 0.5 |
| Pan | 7.5 | 10.5 | 16.0 | 51.5 | 0.5 |

*Table 1 . . . Showing the grain composition of sand types referred to throughout this article.*

**Preprint No. 52-71.** This paper will be presented at a Sand Session of the 56th Annual Meeting, American Foundrymen's Society, at Atlantic City, N. J., May 1-7, 1952.

| A | B | C | D | E | USES |
|---|---|---|---|---|---|
| 1 | 90 | 2.3 | 7.8 | 5.4 | Steel molding sand |
| 2 | 60 | 2.8 | 9.2 | - | Steel core sand |
| 3 | 24 | 3.3 | 11.4 | 3.0 | Molding sand for machinery castings |
| 4 | 20 | 2.1 | 8.1 | 4.6 | Molding sand for stove plates |
| 5 | 12 | 2.4 | 8.0 | 3.3 | Molding sand for stove plates |
| 6 | 100 | 0.4 | 1.7 | - | Oil sand cores |
| 7 | 200 | - | - | - | Oil sand cores |

*Table 2 . . . Qualities of sand mixture after mixing. Letters at top of columns represent the following: A, sand mixture; B; green permeability; C, green shear strength, psi; D, green compression strength, psi; E, moisture.*

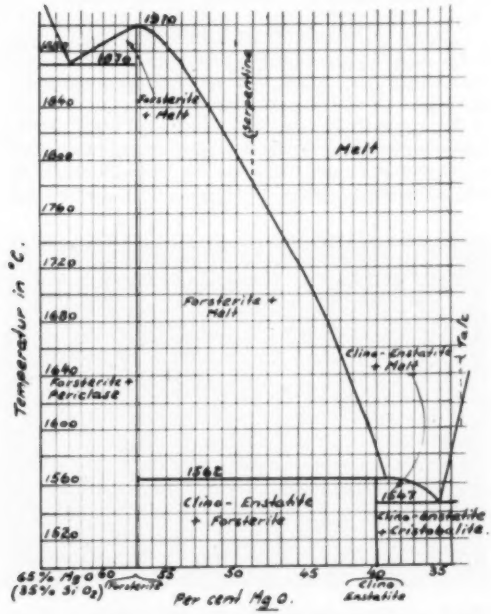
creased, and the steel foundries tried to replace silica with olivine as molding material. It is of primary importance to use olivine in steel foundries because the danger of silicosis is greater than in iron foundries. In Norwegian iron foundries the trend to use olivine has not been so general because of certain technical difficulties which will be dealt with later on in this paper.

One very important aspect of olivine is its ability to withstand heating and cooling without disintegration. The thermal properties of a molding material based on olivine are different from those based on silica. Tests are going on in Norway to establish comparable figures. Of great practical significance is the heat flow in the molding sand. When finely crushed, olivine rock is also used as a parting and dusting powder and in washes. The annual consumption of crushed olivine as molding material in Norway is 8,000 tons. The price of crushed olivine, Table 1, sand type 1, is $9.00 per ton; silica sand costs $5.60 per ton.

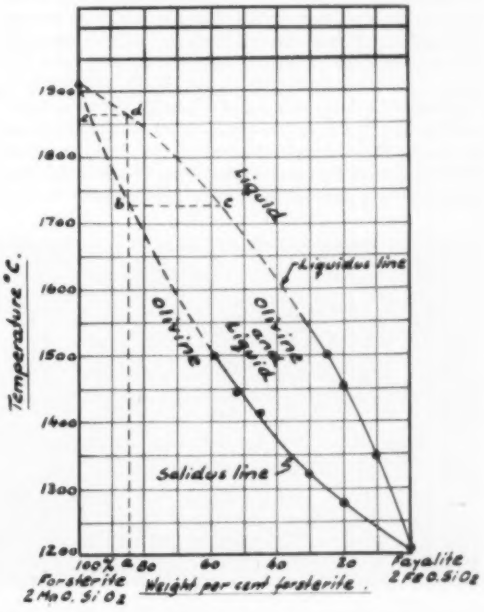
### Olivine for Steel Castings

Olivine has given good results as a molding material for steel castings, but it has not been proved that results are any better than with ordinary silica sand except for manganese and high chromium steels to which olivine gives an excellent surface.

The sintering point is considerably lowered when the MgO content is lowered. Ferrous oxide (FeO) and




*Graph 1 . . . Magnesium silicates in the system MgO-SiO$_2$ on a weight basis. (Bowen and Andersen)*




*Graph 2 . . . Equilibrium diagram of the system forsterite-fayalite on weight basis. (Bowen and Schairer)*

aluminum oxide ($Al_2O_3$) have the same effect. Thus contamination with silica sand must be avoided in steel foundries. In iron foundries the sintering point is still high enough for ordinary castings, even when the olivine contains much silica sand.

All kinds of binders have been tried, such as bentonites, clays, cement, magnesia, dextrin, etc. Western bentonite has given the best results. Sulphite lye ("Totanin") and dextrin have been added to the bentonite, partly to prevent the sand from drying out before molding, and partly to obtain a hard mold surface after drying. Castings weighing up to 15 tons have been poured in olivine-bentonite molds. Cement can also be used as a binder for olivine sand. Castings have been made in this mixture with the same proportion of cement to olivine as for cement to pure silica sand. At present, castings weighing up to 20 tons are made in cement-bonded olivine sand with satisfactory results.

Olivine sand is treated and mixed in the same way as silica sand. Depending on the grain distribution, additions of bentonite from 2 to 4 per cent and of water from 4 to 6 per cent (by weight) produce the most suitable mixtures for green and dry sand molding. Table 2, mixture 1, gives the properties of sand type 1, Table 1, wth 3 per cent western bentonite mixed and aerated in a mulling mixer.

When sulphite lye and dextrin are added to the facing sand, the bentonite addition is corrspondingly decreased. The Dietert sintering point of these mixtures is usually 2640 to 2730 F.

Olivine sand bonded with bentonite is very sensitive to variations in water content. A slight evaporation of water or loss of moisture caused by absorption in bentonite added in dry condition makes the sand feel too dry and reduces its strength. But care should be taken not to add too much water, which will make the sand feel too pasty and make it difficult to work. After some time of practice the molder has no difficulty working in olivine. Olivine is about 25 per cent heavier than silica. The difference in apparent specific gravity due to the different shape of grains of the prepared molding sands, however, is less than 25 per cent. The finer the sand and the better the preparation, the less the difference. Synthetic olivine sand has not been tried in a slinger.

For cores, approximately the same mixtures are being used as for molds, but with small additions of organic binders. Sand type 1 is in most cases too fine for oil sand cores, though very good results have been obtained with cereal binder and herring oil (used in Norway as a substitute for linseed oil). If very high strength is required, additions of 5 per cent western bentonite, 1½ per cent herring oil and 5 per cent water to sand type 1 give good results (mixture 2, Table 2).

The molds are usually dried. They are then coated with a wash of finely crushed olivine. The best results are obtained by using new olivine sand, adding bentonite, and drying the mold. In producing larger and more complicated castings drying is necessary to obtain a good result.

At present all steel foundries in Norway use olivine as molding material. Plain carbon steel, manganese steel, chromium-nickel steel (18 per cent Cr, 8 per cent Ni), high chromium-low nickel steel (27 per cent Cr, 4 per cent Ni) and low chromium steel (14 per cent Cr) are poured in olivine molds. As previously stated, results are more convincing with alloyed steel than with plain carbon steel. When plain carbon steel is poured in olivine molds, penetration is often observed, especially adjacent to the ingates and where the pattern has sharp corners, where the cores are small as compared to the casting section, and where the casting has a large surface; the larger the casting, the greater the penetration.

For manganese and high chromium steels, the results with olivine molds are decidedly better in these respects. It is beyond doubt that olivine here represents a technical advantage compared to silica sand.

### Olivine for Iron Castings

Crushed olivine is used as molding material in iron foundries in producing machinery castings and heavier castings weighing from less than 1 lb up to 8000 lb.

When producing heavier castings, the same considerations for grain sizes and binders must be observed as for olivine in steel foundries. For dried molds which are blacked with graphite for gray iron, addition of

*Fig. 1 . . . "Burnt-on" at the ingate of a carbon steel casting 1¼-in. thick. Casting at right as stripped, casting at left after 3 minutes blast cleaning.*

*Fig. 2 . . . Manganese steel crusher jaw. Casting at left as stripped, casting at right after 3 minutes blast cleaning. There is no "burnt-on," no adhering sand.*

coal dust is not necessary. In green molding, coal dust or another substance of similar effect should be used to prevent adherence of sand to the casting. A finer sand Table 1, type 2, for instance) should be used to obtain a smooth surface. The properties of this sand mixed with 3 per cent western bentonite, 4 per cent coal dust (both by weight) and water, are specified in Table 2, sand mixture 3.

It is not necessary to use pure olivine in the production of molds and cores. Olivine can be used together with silica in all proportions, if the refractoriness required is not too high. This makes the introduction of olivine molding sand easier for gray iron machinery castings.

Olivine sand with the necessary addition of bentonite and coal dust gives very good molding material when combined with old sand mainly consisting of silica. After some time, through the addition of pure olivine sand to cover the losses, the molding sand will practically contain olivine only.

At present only a few foundries have adopted the use of olivine in the production of machinery castings and heavier castings. However, crushed olivine has been used experimentally to a great extent in gray iron foundries in the production of hand and machine molded small castings, especially stove plate castings. Experiments have been carried out with many different types, but with pure crushed olivine only. Some of the types utilized are types 3 and 4, Table 1. Various bentonites, clays, and organic substances have been used as binders. Experiments have been made with and without coal dust, and with addition of wood flour and similar agents.

These binders and other substances have been used alone or in combination with each other. The experiments have shown that technically the best molding material is obtained when they are added to olivine sand in such proportions and combinations as are usual in preparing synthetic sand based on silica. However, the necessary quantity of water is less. The following examples may be mentioned: Sand type 3 with an addition of 4 per cent clay, 3 per cent coal dust (both by weight), and water (see Table 2, sand mixture 4); and sand type 4 with addition of 1.5 per cent southern bentonite, 3 per cent coal dust (both by weight), and water (see Table 2, sand mixture 5).

In spite of all experiments, no mixture has given a really usable result. The surfaces of the castings are not faultless. Small grooves partly filled with sand start at the ingates and spread inwards on the surface. This spoils the casting, and the specifications for the surface of competitive small castings are not satisfied.

Olivine from green molding has been more difficult to prepare for re-use than molding sand based on silica. This applies to all mixtures tested. The olivine close to the casting is especially hard, having a tendency to bake together. Ordinarily, the greater the necessary addition of binders to make the olivine efficient as a molding material, the easier it is to prepare the olivine again. Larger or smaller additions of fine silica sand are possibly necessary to obtain usable results. This is not a satisfactory alternative. Olivine is meant to prevent silicosis in the foundry industry, and therefore olivine ought to be used in pure condition at all times.

Various parting powders based on olivine have been tested. They have all proved to be less suitable than those which are obtainable in the market. Olivine parting powders are heavier, too.

At present no foundry has adopted the use of olivine in the production of flat, thin castings.

Crushed olivine is used as core sand in iron foundries either alone or together with sand mainly consisting of silica. Depending on the type of cores, sand types of different grain sizes have been tested. Sand types 1 and 5, Table 1, may be mentioned as examples. Various bentonites, clays, linseed oil, sulphite lye, dextrin, and cereal binders have been used. The nature and proportions of binders added to obtain a usable core sand for various purposes partly depend on the grain size. Best results are obtained with approximately the same addition of binders as when the core is made of silica sand. However, the addition of water is less.

Sand type 1, with addition of 1.5 per cent cereal binder, 1 per cent herring oil, and 3 per cent water (all by weight) may be mentioned as an example. The properties of this core sand are specified in Table 2, sand mixture 6. The properties of type 5, with the

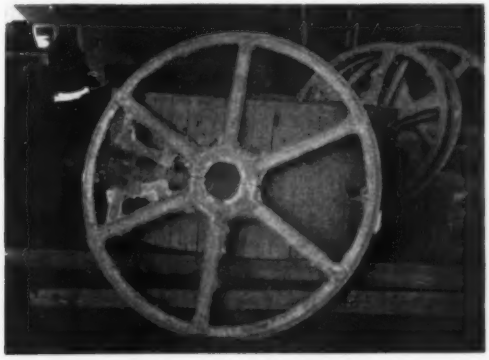


*Fig. 3 . . . High-chromium, low nickel steel wheels. This picture was taken before sandblast cleaning treatment. Compare with Fig. 4 at right.*

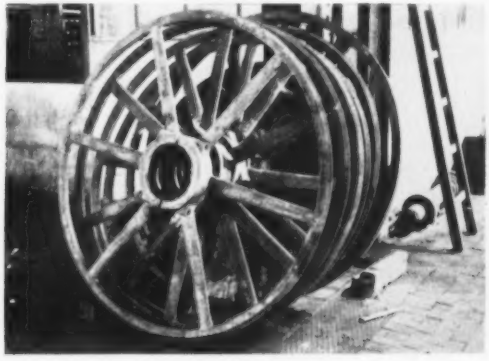


*Fig. 4 . . . Same wheels after blast cleaning. Castings are almost free from adhering sand. Cleaning costs are insignificant. Wheels were cast in sand mix 1.*

same additions, are specified in Table 2, sand mixture 7.

Compared with silica sand as raw material for cores, olivine sand has several drawbacks worth mention:

1. Olivine sand is heavier. On account of this, the weight of the core will increase considerably.

2. Oil sand cores made from olivine sand have less green strength. The core flows. Stronger reinforcements are necessary if the core can be made at all.

3. The drying of olivine sand cores takes more heat, and a thorough drying takes more time.

4. Olivine sand cores retain the heat much longer.

5. The organic binders in olivine sand cores do not burn to the same extent. When the section thickness of the core is large in proportion to the section thickness of the casting, then the casting is apt to tear over the core when cooling, even if the content of binders has been reduced so much that green strength has reached its lowest limit.

6. It is more difficult to remove olivine sand cores from the castings, especially where the section thickness of the castings is small.

Olivine sand cores have no special advantages as compared to silica sand cores, but in some cases they are equal. In production of castings in which the core is comparatively small, the results are very good. The core is supplied with so much heat that the organic binder will burn, so that there is no difficulty in removing the core. All this explains why olivine sand cores are used only to a small extent in iron foundries.

Where refractory properties are of primary importance (such as for split cores and so-called "Cameron feeder cores"), olivine may be used to great advantage.

### Olivine in Non-ferrous Foundries

In non-ferrous foundries, crushed olivine has been tested experimentally on a small scale. Olivine, sand type 3, Table 1, with 2 to 3 per cent bentonite and approximately 4 per cent water gives a satisfactory surface on heavier castings. As regards castings where a high surface finish is required, no usable results have been obtained. Altogether, so few tests have been made that nothing can be concluded on the use of olivine in non-ferrous foundries.

### Summary

Olivine is a highly refractory iron-magnesium silicate. Crushed to a suitable grain size, it is utilized as a molding material in Norwegian foundries, particularly steel foundries. Its thermal properties are very different from those of silica. The main reason for using olivine is the presumption that the risk of developing silicosis is diminished. It is a technical advantage to use olivine for the manufacture of manganese steel and chromium-nickel steel. The results in iron foundries are not convincing.

### References

1. N. L. Bowen and Olaf Andersen, *American Journal Sci.*, 37,487 (1924).

2. N. L. Bowen and Schairer, *American Journal Sci.*, 29 (2) 151-217 (1935).

3. J. Ringstad, "Synthetic Olivine Molding Sand for Steel and Iron Castings at A/S Drammens Jern," *Teknisk Ukeblad*, 1939, (38), p.493.

4. Dagfinn Elstad and Kristoffer Stenvik, "Prophylaxis of Silicosis in Foundries by means of Olivin Rock as Artificial Molding Sand, Oslo 1946." Publication No. 27 from Statens Råstofflaboratorium in 1946.

5. E. J. King, Nancy Rogers, Margaret Gilchrist, W. M. Goldschmidt and G. Nagel Schmidt, "The Effect of Olivin on the Lungs of Rats." *Journal of Pathology and Bacteriology*, Vol. LVII, No. 4 (1945), pp. 488-491.

### Bibliography

Australian Patent No. 111508.

British Patent No. 570719.

W. M. Goldschmidt, *Teknisk Ukeblad*, 1940, pp. 1-7 and *Teknisk Ukeblad*, 1946, pp. 685-687.

K. J. Stenvik, *Journal of The Iron and Steel Institute*, 1949, Vol. 162, Part 1, pp. 44-48.

Gilbert S. Schaller and W. A. Snyder, *Foundry*, 1951, Vol. 79, No. 5, pp. 104-105.

Gilbert S. Schaller and A. M. Nilson, *Foundry*, 1951, Vol. 79, No. 10, pp. 110-111.

*Fig. 5 . . . Stove plate casting (20 x 16 x ¼ in., the ingates on the short sides) poured in olivine sand. The right side is as stripped, left side after cleaning.*

*Fig. 6 . . . Olivine mixed with 4 per cent bentonite is used for ladle lining. This ladle has been used five times for cast iron with no repairing.*

Exchange Paper ★

***A progress report for 1948-1951***

# Risering castings

J. B. CAINE / *Technical Consultant, Wyoming, Ohio.*

*Summarizing recent work on scientific risering, this Official Exchange Paper from A.F.S. to the 1951 International Foundry Congress applies to all metals even though the illustrations are for steel. Difficulties with the use of closely spaced risers required to meet feeding distances are discussed. Methods are advanced to overcome these difficulties and to enable the foundry to produce castings free from dispersed shrinkage with the minimum number of reasonably sized risers and an acceptable yield.*

■ Three years ago the writer presented an exchange paper before the French Foundryman's Association on risering[1], in which he attempted to formulize and collect all available data on the science of risering. It was significant that the science of risering was less than five years old. Until that time, risering of castings was an art. A study of the earlier literature will uncover many papers and articles describing risering of individual castings and risering "tricks", but none on the fundamentals of risering.

The last three years have been even more productive and, therefore, a progress report is in order. Many of the blanks have been filled, especially those concerning riser spacing and temperature gradients required to obtain solidity in uniform sections of cast steel. In the previous paper the writer was only able to formulize riser positioning. Now, it is possible to discuss this phase of risering quantitatively.

The work of Messrs. Pellini, Bishop, Brandt, Dunphy, Myskowski and staff of the United States Naval Research Laboratory has, during the past few years, done much to advance the science of risering. This work is so outstanding as to warrant special mention. Fortunately this work is basic, so it can be applied to all types and sizes of castings. Because it is basic it cannot be applied directly to production castings but must be interpreted. The writer hopes to do some of this interpretation in this paper.

At present this work is farther advanced for steel than for other metals. It is only a question of time before similar data are forthcoming for the others.

As the paper referred to in the first paragraph has been published in France, England, and the United States, little space will be devoted to its review. The two most important points can be summarized by Fig. 1 for riser positioning, Equation 1 and Fig. 2 for riser dimensioning. It must be emphasized and reemphasized that all risering must be divided into these two phases, positioning and dimensioning. An equally important corollary is that shrinkage at the riser-casting junction must be differentiated from shrinkage in the

NOTE: Although not a convention preprint, this paper will also be included in A.F.S. TRANSACTIONS, Vol. 60, (1952).

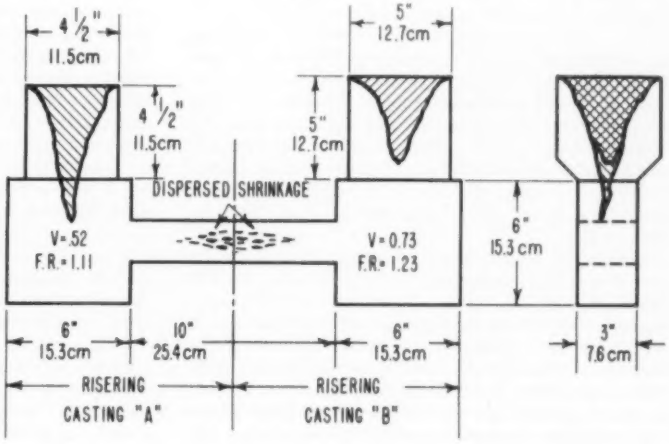



*Fig. 1 . . . Basic risering system showing shrinkage under the riser due to insufficient riser, and solidity with correct riser size. Since heavy sections are joined by lighter sections that freeze off and isolate the heavy sections at an early stage of solidification, each heavy section can be risered as an individual casting. Two types of shrinkage—at and away from the riser —are shown here.*

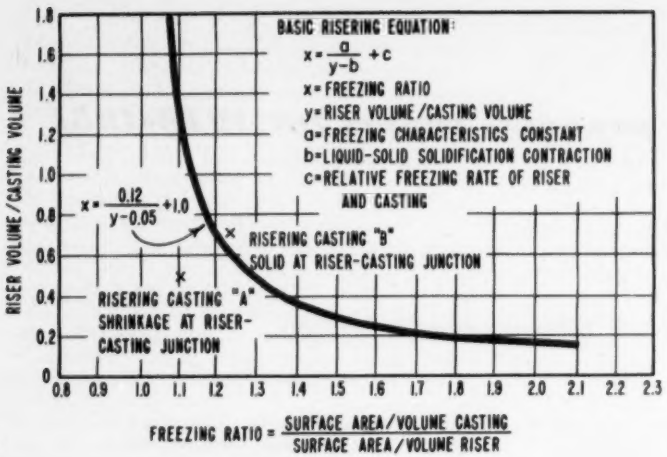

BASIC RISERING EQUATION:
$x = \frac{a}{y-b} + c$
x = FREEZING RATIO
y = RISER VOLUME/CASTING VOLUME
a = FREEZING CHARACTERISTICS CONSTANT
b = LIQUID-SOLID SOLIDIFICATION CONTRACTION
c = RELATIVE FREEZING RATE OF RISER AND CASTING
$x = \frac{0.12}{y-0.05} + 1.0$
RISERING CASTING "B" SOLID AT RISER-CASTING JUNCTION
RISERING CASTING "A" SHRINKAGE AT RISER-CASTING JUNCTION
RISER VOLUME/CASTING VOLUME
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
FREEZING RATIO = SURFACE AREA/VOLUME CASTING / SURFACE AREA/VOLUME RISER

*Fig. 2 . . . Basic risering equation for dimensioning risers. Curve does not include any factor of safety; factor can be included by adding whatever amount is desired to constant c in the equation. For example, a factor of 5 per cent should be enough for steel. Curve does compensate for chills. When chills are used, the surface area in contact with them is multiplied by a factor which approaches 5 as full coverage of the section is approached. This will decrease riser size.*

casting away from this junction. Unless these two phases of risering and modes of shrinkage are differentiated, there will be continual confusion of thought.

Figure 1 formulizes the basic risering system, a number of relatively heavy sections joined by lighter sections that freeze off and isolate the heavy sections at an early stage of solidification. Therefore, each of the heavy sections can be risered as an individual casting, according to Fig. 2. The two types of shrinkage, at and away from the riser, are illustrated in Fig. 1. Steel has been selected for illustrative purposes and clarity. It cannot be emphasized too strongly that all metals behave the same on solidification: they contract. The difference is one of degree, not kind.

This point is not appreciated by many foundrymen, especially those in the iron and non-ferrous fields. Voids caused by solidification contraction are, in many of these alloys, dispersed to almost microscopic size. So called "open grain" in the cast iron is a typical example. True, many times this "open grain" is due to too high carbon content. Many times it is due to the same type of shrinkage shown as a definite shrinkage cavity in Fig. 1, except that the shrinkage cavity is dispersed into many millions of tiny cavities.

The reader can imagine the confusion resulting from trying to eliminate "open grain" due to solidification shrinkage by minor changes in metal composition. An actual experience may be illustrative. A certain iron foundry had been making a bushing-like casting for years, when all of a sudden the majority of castings were rejected for open grain. Frantic efforts changing the metal analysis and melting practice were unavailing. Sand and gating changes did not eliminate the trouble.

Finally, in desperation an adequate riser was used and the trouble disappeared. Why did the trouble show up after thousands of castings had been satisfactory with the old risering set up? After the reason was found the explanation was simple. The user of the castings had installed new high speed machining equipment for higher production. The smoother, almost polished machine surfaces resulting from these higher machining speeds made the small shrinkage voids visible. The older machines gave such a rough machined surface that it obscured these tiny voids.

A minor mystery that has intrigued the iron foundryman for years can possibly be explained by this concept of dispersed shrinkage. Womochel and Sigerfoos[2] reported years ago the difference in shrinkage characteristics of iron as influenced by the molding sand. Taylor and Schmidt[3] have checked these findings and in doing so made a significant observation. The density of the iron in the sound areas of those castings showing definite shrinkage voids was higher than the density of the iron in those castings that were visually sound. As was discussed in reference 1, metals with low solidification shrinkage such as iron are quite sensitive to minor variations in rates of heat extraction and thermal gradients. Could it be that a change in rate of heat extraction and skin formation due to sand would cause dispersed shrinkage in one case, concentrated shrinkage in another?

Therefore, the reader should not dismiss the overall picture of solidification shrinkage, simply because the particular cavities illustrated in this paper for steel do not look exactly like those shown by his metals. A similar warning should be made regarding the risers shown. Top open risers are shown simply for clarity of presentation. Side blind, top blind, side open, either with or without necked down cores can be used. There is no change in fundamentals, only a difference in such details as shape and location of the shrinkage cavity or cavities (if any), change in riser size, etc.

Space does not permit a detailed discussion of Fig. 2, or details as to the derivation of Equation 1. This has been covered in reference 1.

### Risering Uniform Sections

The uncertainty in Fig. 1 lies in the dispersed shrinkage in the uniform section and in riser positioning to eliminate it. This type of shrinkage seems to be common to all metals. Even steel that shows definite shrinkage voids at hot spots and junctions of sections is prone to this dispersed shrinkage in uniform sections. The approach of the steel foundryman has been to promote directional solidification, or use

closely spaced risers, not to blame it onto sand, metal analysis, gas, and other mysterious phenomena. All foundrymen would do well to consider this approach.

Tapering the section to promote directional solidification as discussed in reference 1 for steel is one method of eliminating dispersed shrinkage. Usually the tapering or padding required is prohibitively expensive, especially if the padding must be removed. Therefore, the usual approach of the steel foundryman to eliminate dispersed shrinkage in uniform sections has been closely spaced risers. Until very recently this type of riser positioning has been a matter of guesswork and has caused quite a bit of trouble.

The uniform single risered sections illustrated in Fig. 3 are simply variants of the basic risering system of Fig. 1 in which one heavy section has been removed, the other replaced and changed slightly to make it a riser. The question, unanswered until recently, is: How far can a given steel section be fed sound with a single riser? Figure 3 summarizes the work of the staff of the Naval Research Laboratory on this subject [4,5]. The criterion of soundness used by the Naval Research Laboratory is radiographic soundness to 1½ per cent sensitivity of ½ and ¼ in. (1.28 and 0.65 cm) sections taken from the center of the cast section. This insures no voids in the metal whose greatest dimension exceeds 0.0075 in. (0.2 mm).

It was found that feeding distance is a function of section thickness (T). This function varies with the geometry of the section. Semicircular and circular plate-like castings were studied in ½, 1, 1½ and 2 in. (1.28 to 5.1 cm) thicknesses. Square bars investigated varied in size from 2 to 8 in. (5.1 to 20.3 cm). The dimensions of the rectangular sections are in Fig. 3.

Figure 4 summarizes the findings of the Naval Research Laboratory on the effect of gate position and multiple risers. The criterion of soundness is the same as for the single risered castings in Fig. 3. It is quite surprising that the position of the gate is not important. However, it should be emphasized that this statement may only apply to short feeding distances and closely spaced risers. If feeding distances are increased above those shown in Fig. 4, it is quite probable that gate position and metal flow will become important. Temperature gradients seem to determine solidity as far as dispersed shrinkage in uniform sections is concerned. Therefore, the position should be highly influential. This phase of risering will be discussed later.

The temperature gradients influential in Fig. 3 and 4 are those of the end of the casting and the riser. It was found that the casting end was sound for a distance of 2½ times the section thickness (2½T). The temperature gradient due to the riser contributed soundness for a distance of 2T, *when the section was sound thruout*. Therefore a single risered section, whether fed from the end or from the center, can be fed sound in steel for a distance of 4½ T. However, if the section is fed by two risers, one at each end of the casting section, there is no end effect and the distance between risers can only be 4T (2T for each riser).

The feeding distances shown in Fig. 3 and 4 are the maximum sizes or lengths that can be fed sound in steel. If these dimensions are exceeded, dispersed shrinkage will first be found *close to the riser*, as has been shown in reference 4. As the feeding distance is increased further, the length of the area showing dispersed shrinkage becomes longer. The size of the dispersed shrinkage voids seems to increase more slowly.

May it again be emphasized that all metals will show a relation between dispersed shrinkage away from the riser and feeding distance as illustrated in Fig. 3 and 4 for steel. Perhaps in some cases the feeding distance will be much greater, but in most metal there will be a relation, differing from the steel relation in degree certainly, but just as certainly not differing in kind.

This dispersed shrinkage in steel occurring close to the riser when the feeding distance is exceeded is not affected by riser size, at least under the conditions studied so far. The volume-freezing ratio points for the individual castings in reference 4 are plotted in Fig. 5. The points differentiate shrinkage and solidity away from the riser, not at the riser-casting junction. As can be seen, there is no relation at all between shrinkage away from the riser, riser size, or the line differentiating shrinkage and solidity at the riser-casting junction. This is true for even extreme differences in riser size and freezing ratio.

For example, one casting was solid with a riser volume of only 24 per cent of the casting volume (V, 0.24; FR, 1.48). Another showed dispersed shrinkage with a riser volume 320 per cent of the casting (V, 3.20; FR, 2.76). Each group of ascending points in Fig. 5 represents a given section made with the same riser, or risers, varying the length, or feeding distance. Each group shows both solid castings and those with dispersed shrinkage regardless of its position.

It must be emphasized that the feeding distances plotted in Fig. 5 are mostly for risers with a riser contact equal to the full diameter of the riser. There are two exceptions, the semicircular plates in Fig. 3 and the casting fed vertically in Fig. 4. All the castings in these two groups were fed with risers whose volume exceeded 100 per cent of the casting volume (riser volume/casting volume over 1.0). This point may be important.

Brinson and Duma[6] have shown that when steel castings are fed through necked down cores, the occur-

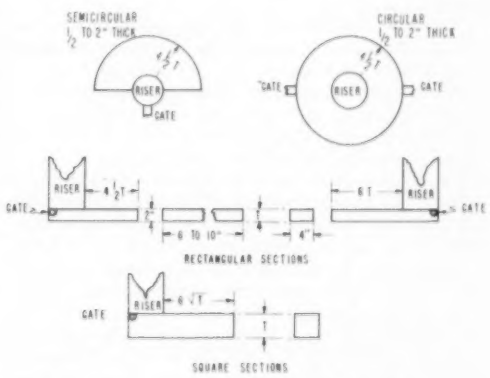



***Fig. 3 . . . Diagrams show maximum distances that can be fed with one riser without dispersed shrinkage. If these dimensions are exceeded, dispersed shrinkage will first be found close to the riser. (From Bishop & Pellini)***

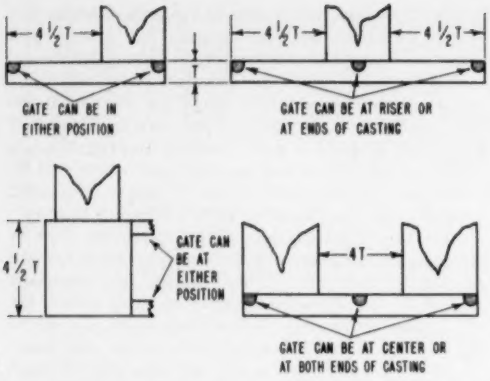



*Fig. 4 . . . Effect of gate and riser positions on feeding distances of 2 x 8-in. sections. Riser spacing much in excess results in scrap. (From Bishop & Pellini)*

rence of a type of shrinkage resembling centerline dispersed shrinkage is dependent on the length of section to be fed. At a feeding distance of 1T, the opening in the necked down core between the riser and casting can be relatively small and the core thickness can exceed ½ in. (1.28 cm). An increase in feeding distance to only 2T will result in shrinkage immediately below the reduced neck between casting and riser. Increasing the feeding distance accentuates this shrinkage.

Perhaps the type of shrinkage studied in reference 6 is not related to dispersed shrinkage as discussed in this paper. Perhaps it is. If it is only remotely related to dispersed shrinkage, the wide variation in shrinkage encountered by Brinson and Duma points to contact area of the riser as being a major variable in feeding distance. This phase of risering has not been investigated. It is so important that it should be placed first on the agenda of future investigations.

If the points discussed in the previous paragraphs are accepted, they must change the thinking of the majority of steel foundrymen on two important points:

(1) Increasing the riser size with an adequate contact will eliminate or decrease dispersed shrinkage away from the riser.

(2) There is an area of sound metal close to the riser, regardless of length and size of casting.

Both of these misconceptions have led to instances of extreme over-risering and very low yields.

The feeding distances of steel risers shown in Fig. 3 and 4 are disappointingly short, especially when more than one riser must be used to feed a uniform section. This brings up the question: Is maximum solidity, as determined by riser spacing as in Fig. 3 and 4, required? On highly machined, highly stressed castings such as cut tooth gears, the answer must be yes, for such castings are being made today with riser spacing approaching those of Fig. 3 and 4. Riser spacing much in excess of that shown in Fig. 4 will result in scrap castings.

However, there have been too many millions of steel castings that have performed satisfactorily in the past, fed with more widely spaced risers, to discard past risering practices. The question boils down to: What mechanical properties can be expected with various degrees of solidity as far as dispersed shrinkage is concerned? It will be many years before this question can be answered with any degree of certainty. The first point that must be settled is what tests are to be used to evaluate servicability. The test now used almost universally is the tension test. This test is probably the most sensitive test for dispersed shrinkage. An appreciable decrease in reduction of area is experienced in 1 in. (2.5 cm) steel sections when the feeding distance is as short at 3T.

There are many objections to the tension test as an evaluating test from the designer's point of view. The writer has conducted what might be called a one-man crusade about these objections [7,8,9] and has proven, at least to his satisfaction, that this test is meaningless as far as evaluating serviceability. This is particularly true for the elongation and reduction of area components. The two tensile properties that do have meaning in design are yield point, or elastic limit, and modulus of elasticity. Both of these tensile properties are not affected by even gross rounded discontinuities[8] and all evidence to date shows that they are not affected by dispersed shrinkage in steel to a degree found in even unfed sections.

There are no formal data on the effect of dispersed shrinkage on notched impact strength or fatigue strength, two tests that do have meaning in evaluating servicability. There are service data. What better test for resistance to shock loading can be found than the railroad coupler? Consider the impact load that these castings must transmit when a 100-car train starts up by "taking the slack out of the couplers" and jerking the cars forward. Many thousands of these castings have performed satisfactorily at temperatures as low as −40 F. Such castings contain dispersed shrinkage and perform satisfactorily without excessive safety factor.

At least one important blank needs filling—the effect of dispersed shrinkage on fatigue strength. The only published work on this subject that the writer can find is that of Sims[10] in which no difference could be found in the fatigue strength of specimens cut from forged and centrifugally cast airplane cylinder barrels. Service evidence indicates no great effect, for again there have been too many cast parts that have performed satisfactorily under high fatigue stresses. Formal proof would be advantageous.

The feeding distance ratios given in Fig. 3 and 4 are important, regardless of the values given them. Even though greater distances are used for most castings, why not rationalize these feeding distances? If 4T between multiple risers is not necessary, why not use 6T, 8T, 10T, or whatever value produces acceptable castings? Such a system will eliminate many of the production difficulties that are now thought to be mysteries. If it is safe to extrapolate the values in Fig. 3 and 4 to sections larger than 2 in. (5.1 cm), it will be found that many thick sections are now over-risered and that fewer risers than are now being used will feed these sections sound.

### Temperature Gradients

Even though present evidence indicates that dispersed shrinkage is not too harmful when present in

castings subject to normal design stresses, there are classes of castings that need to be made with closely spaced risers, if for no other reason than appearance. On the other hand, there is evidence that the critical areas of steel castings designed to low factors of safety and used at tensile strengths exceeding 120,000 psi must be cast at least as sound as the castings shown in Fig. 3 and 4. The question is how to obtain this degree of solidity economically.

Additional work by the Naval Research Laboratory points to a solution. The investigations of references 4 and 5 show that if the temperature gradients in plate-like sections of steel exceed 1-2 F per inch (0.22 -0.44 C per cm) no dispersed shrinkage is found. The temperature gradients of square sections need to be greater, 7-12 F per inch (1.54-2.64 C per cm) to obtain the same degree of solidity. Here is the first quantitative data as to what temperature gradients are required to obtain this much-discussed directional solidification that is required.

This same group of investigators has also contributed information on the effect of chills on temperature gradients on solidifying cast steel[11]. They find that an adequate chill, one of sufficient thickness to extract heat until final solidification, will extend thermal gradients for longer distances into the casting (unpublished work by N.R.L.). If a temperature gradient of only 1-2 F per inch is required to produce sound plate-like sections in steel, it should not be difficult to set up this temperature gradient for longer distances by the use of strategically placed chills. For that matter, it should be possible to extend such a small gradient by gating and proper metal flow. A gradient of 7-12 F per inch will be more difficult to achieve, but is within the possibilities of chills. An important gap in this knowledge is the temperature gradient required for solidity at junctions of sections.

Much of the basic information is now at hand to not only riser uniform sections of cast steel to the solidity required for the most severe inspection, but also to produce this solidity without the use of excessive risers. A start has been made on other metals. The thermal behavior of cast iron has been studied[12] and these data can be applied to dispersed shrinkage problems in iron, just as similar work has been applied for steel.

### Riser Dimensions

The use of closely spaced risers to obtain the minimum amount of dispersed shrinkage creates problems in riser dimensioning that were not discussed in reference 1. In fact, they were not even thought of at that time. Probably the greatest difficulty is the seeming inability to obtain proper feeding efficiency when risering with feeding distances approaching those shown in Fig. 3 and 4. The reason is not any mysterious change in solidification characteristics, but a decided change in the surface area-volume relation as the length decreases. This is particularly important with multiple risered castings, especially circular shapes and rings. There is no end surface area to promote gradients with these shapes. When the length dimension is decreased, the decrease in surface area through which heat is dissipated is surprisingly large.

This effect is shown in Fig. 6. In this chart the riser volume required to feed the casting, or part of the casting, is plotted against length (expressed as a function of thickness for various section ratios from 1:1 to 1:3. The riser volume is expressed as a fraction of the casting volume. Two series are plotted, one for single risered castings when the end surface areas are effective in dissipating heat, one for multiple risered castings when there is no end surface area effective insofar as heat dissipation is concerned.

The expected increase in riser size required due to increased mass of section to be fed (width times thickness) is overshadowed by the increase in riser size required as the length decreases, as it must with closely spaced risers. Quite unexpected is the sharper rate of increase as the section size decreases. Small sections need larger closely spaced risers in relation to the casting volume than do the larger sections. When the distance between risers becomes less than 4T it will be found that the only riser that will feed a ring-like section is a continuous riser.

### Complicating Factor

Another complicating factor when risering casting shapes such as gear rims is the restriction in heat dissipation at the T-shaped junction of web and rim. This restriction to heat flow into the sand increases as the distance from the hub to the rim decreases, until finally the surface area of the inner surface of the rim is no longer effective and cannot be included in the surface area-volume calculations. Nothing quantitative is known at present regarding this important phase of riser dimensioning. Experience has shown that a small core surrounded by a large mass of metal extracts so

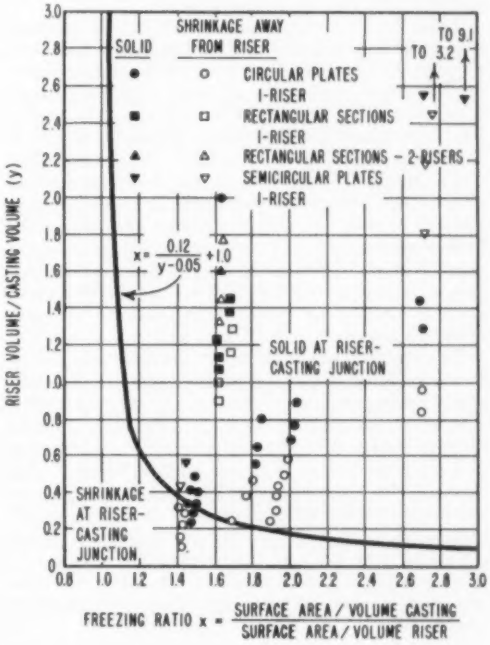

SHRINKAGE AWAY FROM RISER
SOLID
TO 9.1
TO 3.2
CIRCULAR PLATES 1-RISER
RECTANGULAR SECTIONS 1-RISER
RECTANGULAR SECTIONS - 2-RISERS
SEMICIRCULAR PLATES 1-RISER
x = 0.12/(y-0.05) + 1.0
SOLID AT RISER-CASTING JUNCTION
SHRINKAGE AT RISER-CASTING JUNCTION
RISER VOLUME/CASTING VOLUME (y)
FREEZING RATIO x = SURFACE AREA/VOLUME CASTING / SURFACE AREA/VOLUME RISER
0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

*Fig. 5 . . . This graph clearly demonstrates the independence of dispersed shrinkage to riser size.*

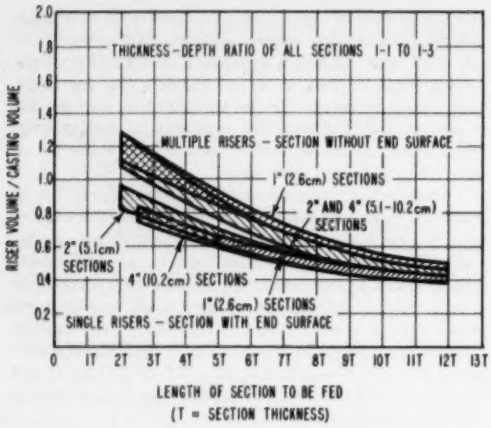



*Fig. 6 . . . This graph shows the effect of end surface area on the required riser volume.*

little heat that the surface area of such cores should not be included in the surface area-volume calculations.

In the case of the gear rim, only a fraction of the surface area of the inner surface of the rim will be omitted as ineffective. What this fraction should be cannot be estimated at present. However, it is important. If conditions are such that only half the inner surface is effective in heat transfer, it will be found that the riser size need be about doubled for closely spaced risers, spaced 4T to 5T apart.

Two possible solutions are available to the problem of producing sound uniform sections with a minimum number of risers and high yield. Although the following discussion applies only to steel from a quantitative standpoint, the same principles apply to all cast metals. The only reason for limiting the discussion to steel is that the constants are not available for other metals.

The first solution involves again the use of external chills. As was discussed previously, it should be possible to increase the feeding distance of risers by the proper use of chills. This automatically means fewer risers. All that is necessary for the practical application of this principle for steel is some experimental work in translating temperature gradients as determined in references 4 and 5 into feeding distances.

The use of external chills will decrease riser size in two ways. More widely spaced risers will decrease riser size according to Fig. 6. Secondly, the effective surface area of that geometric surface area in contact with the chills is increased by a factor proportional to the rate of heat extraction of a chilled surface versus a sand surface. This means for steel that the surface area in contact with the chills is multiplied by a factor which approaches 5 as full coverage of the section is approached. The effect of this increase in surface area in decreasing riser size is automatically taken care of in the surface area-volume calculations according to Fig. 2.

Chills therefore have three advantages. They permit an increase in riser spacing with fewer risers to cut off and grind. At the same time they make possible a substantial decrease in riser size due to this longer riser spacing as well as an additional decrease in riser size because of an increase in cooling rate of the casting. Further investigational work on the proper application of external chills will be very worthwhile.

Chills should be used wherever possible. If for any good reason they cannot be used, there is another method of decreasing riser size: decreasing the rate of solidification of the riser by means of insulators with a lower thermal diffusivity than sand, or addition of heat to the riser. It is probable but not proven that riser spacing will not be affected by these means.

Any change in the relative solidification rate of the riser can easily be incorporated in the basic risering equation. Constant c in this equation:

$$(1) \qquad x = \frac{a}{y - b} + c$$

measures the relative freezing rate of the casting and riser. If the casting and riser are in contact with the same sand, the relative freezing rate is unity and c=1.0. If any thing is done to decrease the freezing rate of the riser, the value for c becomes less than unity.

Curve A in Fig. 7 is drawn for steel with c=1.0 and duplicates the curves in Fig. 2 and 5. Again, steel is used for an example only because the constants a and b are known for steel. If an insulating or exothermic material is used on or around the riser so that the freezing rate of the riser is decreased 10 per cent, constant c becomes 0.90 and the curve denoting the change from shrinkage to solidity at the casting-riser junction shifts to the position of curve B. If the freezing rate of the riser can be decreased 50 per cent, the resulting curve for c=0.50 is shown by curve c.

### Effect of Casting Shape

As can be seen in Fig. 7, if the casting is "rangy," when the freezing ratio is greater than 1.3, the decrease in riser size (even with a 50 per cent decrease in riser freezing rate) is not great. The lines are close together. With "chunkier" castings, when the freezing ratio is less than 1.3, the lines separate and the decrease in riser size possible by decreasing the relative freezing rate of the riser becomes quite large. No general relation can be given, for the riser size depends on the exact geometry of the casting section to be fed. The diagonal straight lines in Fig. 7 illustrate two examples, one a rangy casting made with one riser, one a chunky section requiring multiple risers.

The rangy 1 x 3 x 20 in. (2.5 x 7.5 x 50.8 cm) section requires a riser 33 per cent of the casting volume (the intersection of the diagonal straight line with curve A) for solidity at the riser-casting junction if the riser freezes at the same rate as the casting. A 10 per cent decrease in freezing rate of the riser will only allow a decrease in riser size to 28 per cent of the casting volume. A 50 per cent decrease will allow a decrease in riser volume to 20 per cent of the casting volume. It is doubtful if this small decrease will justify the time and expense of application of insulators or strongly exothermic pipe eliminators.

The preceding paragraph should not be misconstrued that the writer does not advocate the use of pipe eliminators for such castings. A prime function of a pipe eliminator is to keep the riser open to at-

mospheric pressure. This is necessary for all risers. The preceding remarks apply only to those materials and processes that are used primarily to reduce riser size.

When the casting becomes chunky, as illustrated by the 3 x 9 x 12 in. (7.5 x 22.9 x 31.2 cm) section in Fig. 7, even a slight decrease in relative freezing rate of the riser permits a significant decrease in riser size. A decrease in freezing rate of only 10 per cent allows the riser to be decreased from 100 to 78 per cent, increasing the yield from 50 to 56 per cent. If the relative freezing rate can be decreased by 50 per cent, the riser volume need be only 33 per cent and a yield of 75 per cent is possible.

It should at least be mentioned that the foregoing values and the position of the curves in Fig. 2, 5, and 7 do not include any factor of safety. Production risering curves should include some small factor of safety. This can be accomplished by adding whatever amount is decided to constant c in equation 1. A factor of safety of 5 per cent should be sufficient for steel.

There is still much to be learned. The following points are, in the writer's estimation, the most important.

1. Determination of the effect of riser contact on feeding distance.

2. Determination of constants a and b in equation 1 for metals other than steel.

3. Feeding distances in junctions of sections.

4. Determination of the restriction to heat flow into the sand at junctions of sections and its correlation to effective surface area.

5. Determination of the correlation of temperature gradients set up by external chills and feeding distances.

The author hereby gratefully acknowledges the help of Mr. W. S. Pellini in the preparation of this manuscript and for his presentation of the paper at the International Foundry Congress, Brussels, Belgium.

### References

1. J. B. Caine, "Risering Castings," French Foundrymen's Association Transactions (1948); published in England by Enfield Rolling Mills Ltd., Enfield; A.F.S. TRANSACTIONS, vol. 57, p. 66 (1949).

2. H. L. Womochel and C. C. Sigerfoos, "Influence of Mold on Shrinkage in Ferrous Castings," A.F.S. TRANSACTIONS, vol. 48, p. 591 (1941).

3. H. F. Taylor and W. A. Schmidt, "Risering of Gray Iron Castings, Research Report No. 3," (to be published by A.F.S.).

4. H. F. Bishop and W. S. Pellini, "The Contribution of Riser and Chill-Edge Effects to Soundness of Cast Steel Plates," A.F.S. TRANSACTIONS, vol. 58, p. 185 (1950).

5. H. F. Bishop, E. T. Myskowski, and W. S. Pellini, "The Contribution of Riser and Casting End Effects to the Soundness of Cast Steel Bars," A.F.S. TRANSACTIONS, vol. 59, p. 171 (1951).

6. S. W. Brinson and J. A. Duma, "Observations on Knock Off Risers as Applied to Steel Castings," A.F.S. TRANSACTIONS, vol. 56, p. 586 (1948).

7. J. B. Caine, "What is Strength?" *Foundry*, July 1948.

8. J. B. Caine, "Radiography as a Foundry Tool," *Foundry*, Jan. 1949.

9. Caine and Haught, "Slack Quenching vs Quench Cracking," *Metal Progress*, Sept. 1949.

10. C. E. Sims, "Comparative Properties of Cast and Forged Steel," *Foundry*, May 1945.

11. H. F. Bishop, F. A. Brandt, and W. S. Pellini, "Solidification of Steel Against Sand and Chill Walls," A.F.S. TRANSACTIONS, vol. 59, p. 435 (1951).

12. R. P. Dunphy and W. S. Pellini, "Solidification of Gray Iron in Sand Molds," A.F.S. TRANSACTIONS, vol. 59, p. 425 (1951).

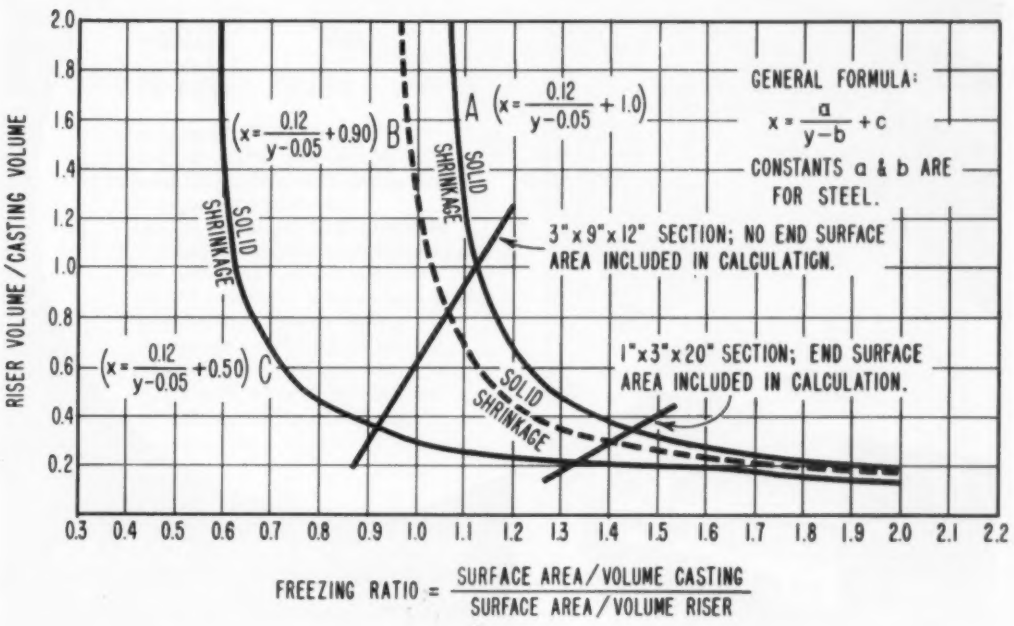

RISER VOLUME / CASTING VOLUME
FREEZING RATIO = SURFACE AREA / VOLUME CASTING / SURFACE AREA / VOLUME RISER
GENERAL FORMULA:
x = a/(y−b) + c
CONSTANTS a & b ARE FOR STEEL.
3"x9"x12" SECTION; NO END SURFACE AREA INCLUDED IN CALCULATION.
1"x3"x20" SECTION; END SURFACE AREA INCLUDED IN CALCULATION.
A (x = 0.12/(y−0.05) + 1.0)
B (x = 0.12/(y−0.05) + 0.90)
C (x = 0.12/(y−0.05) + 0.50)
SOLID SHRINKAGE
SOLID SHRINKAGE
SOLID SHRINKAGE

*Fig. 7 . . . Effect of change in constant c on riser size. Like Fig. 2, the curves do not include any safety factor.*

## THER-MONIC ADVANTAGES

- Rapid conveyorized baking with capacities ranging from 500 to 8,000 lbs. of cores per hour.
- Process saves time and labor.
- Requires no oven warm-up time.
- Produces no external heat.
- Over-baked cores are impossible.
- Cores may be used immediately after baking.
- They possess high strength and hardness.
- Good dimensional stability.
- Good green strength without cereal.
- Excellent shakeout characteristics.
- Superior collapsability and permeability.
- Casting rejects are practically eliminated.
- Equipment requires little space.
- Possesses superior thermal efficiency.
- Bakes with lower ... more precise temperatures.
- Power consumed is proportional to the mass of cores being baked.
- Smoke and fumes minimized.
- Emergency orders can be immediately executed.
- Promotes cleanliness.

# THER-MONIC

## *Electronic* CORE BAKING EQUIPMENT

*Visit-*

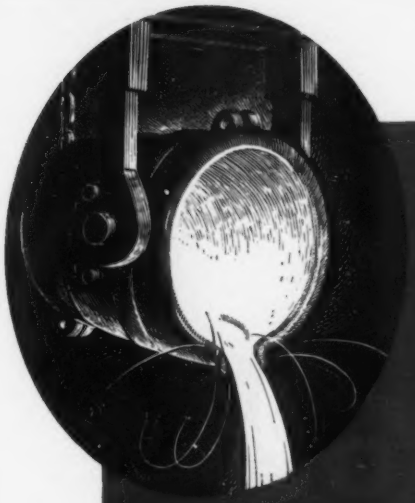
**BOOTH #1219-21**

**If you maintain a medium to large production core room . . . you should investigate at the Foundry Show the many advantages of THER-MONIC electronic core baking! As originators of this process and equipment . . . Induction Heating Corporation has the longest record of experience and the greatest number of installations in the foundry field. Let us answer any questions you may have about your own requirements. Your visit to our exhibit will be appreciated.**

**INDUCTION HEATING CORPORATION**

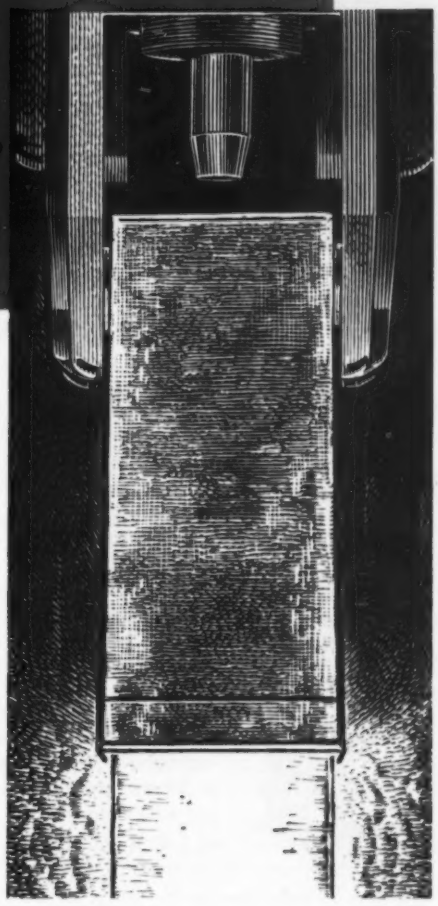
181 WYTHE AVENUE · BROOKLYN 11, N. Y.

*Largest Producers of Electronic Heat Treating Equipment*



POUR FASTER...

STRIP FASTER...



# AND ADD LIFE TO CRITICAL MATERIALS with NATIONAL TRADE-MARK Graphite Stool Inserts!

Mold stools with graphite inserts stand up to the hot-metal impact of fast, uniform pouring... absolutely *eliminate* the bottleneck of stool-sticker slow-ups. Ingot cars move evenly... you get greater man-hour productivity and, incidentally, much longer life from essential materials and equipment.

***Write to National Carbon Company for information.***

---

*The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation*

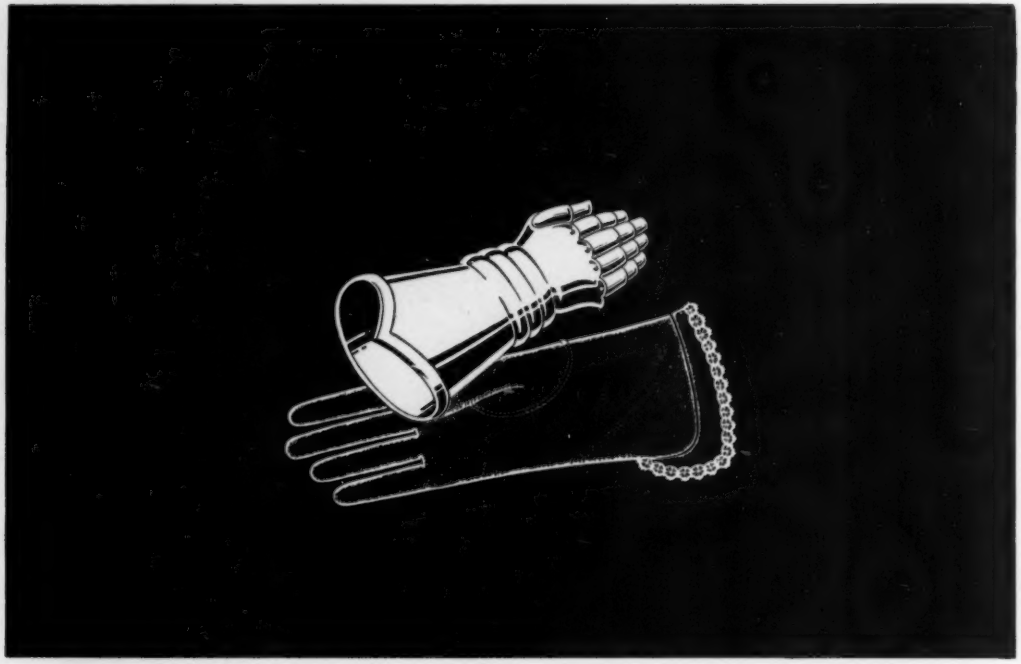
**NATIONAL CARBON COMPANY**

**A Division of Union Carbide and Carbon Corporation**

***30 East 42nd Street, New York 17, N. Y.***

*District Sales Offices:* Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

*In Canada:* National Carbon Limited, Montreal, Toronto, Winnipeg



# THE IRON FIST IN A *Velvet Glove*

Supposing—just supposing—YOU could write the specifications for an ideal blastcleaning chilled shot and grit. What qualities would you specify? You'd want it to be hard, of course, so it would clean fast. But you wouldn't want it so hard as to wear out your equipment at a rapid rate. Neither would you want the shot to be hard AND BRITTLE.

The ideal chilled iron shot and grit would be hard enough to do a fast cleaning job. And, if possible, you would want the hard iron carbides (that do the cutting) imbedded in some soft material that would go easy on your equipment and keep the shot from shattering into small ineffectual fines. What you would want is a sort of an "iron fist in a velvet glove" kind of shot and grit.

It may come as a surprise to you that there *is* such a shot and grit made. A chilled iron shot that holds the iron carbides in a *ductile matrix*—a shot that is hard enough to clean fast, yet soft enough to spare equipment and keep the shot from shattering too quickly. It is National Controlled "T" Shot and Grit.

We're not going to make any wild claims—we know YOU can appreciate the advantages of such shot and grit—providing what we say is true. And we'd like to prove our case *in a matter of minutes*—if you'll let us. Please write your name and address on the lines below and mail the coupon to the nearest Hickman-Williams office. The most you can lose is the cost of postage, but you may profit to the tune of a substantial sum of dollars.

NATIONAL CONTROLLED "T" SHOT AND GRIT *IS PRODUCED EXCLUSIVELY BY*
**NATIONAL METAL ABRASIVE COMPANY • CLEVELAND, OHIO**
**WESTERN METAL ABRASIVES COMPANY • CHICAGO HEIGHTS, ILL.**
*AND SOLD EXCLUSIVELY BY*

**HICKMAN, WILLIAMS & COMPANY**
(INCORPORATED)

CHICAGO • DETROIT
CINCINNATI • ST. LOUIS
NEW YORK • CLEVELAND
PHILADELPHIA • PITTSBURGH
INDIANAPOLIS

*OK. Let's see you prove your point...*

Name_____

Firm_____

Address_____

City_____

MAIL TO HICKMAN, WILLIAMS OFFICE NEAREST YOU

# *American Foundrymen's Society introduces*

## New Sustaining Members

*Ford Motor Co., Cleveland Fdry., Berea, Ohio*—E. C. Jeter, Plant Mgr., (Northeastern Ohio Chapter).

*Lakeside Malleable Casting Co., Racine, Wisconsin*—W. V. Osborne, Pres., (Wisconsin Chapter) Conversion from Company.

## New Company Members

*W. J. Bullock, Inc., Fairfield, Ala.*, C. F. Allison, Sls. Mgr., (Birmingham Chapter) Conversion from Personal.

*Wm. Demmler & Brothers, Kewanee, Ill.*, John N. Demmler, Owner, (Quad City Chapter) Conversion from Personal.

*Eck Foundries, Inc., Manitowoc, Wis.*, Robert W. Eck, Vice-Pres., (Wisconsin Chapter).

*Monsanto Chemical Co., Springfield, Mass.*, Edmond S. Bauer, Asst. Sales Mgr. (Eastern New York Chapter) Conversion from Personal.

*Mansfield Brass & Aluminum Corp.*, Glenn L. Bierly, Pres. & Treas., (Northeastern Ohio Chapter) Conversion from Personal.

*Nock & Sons Co., Cleveland*, Charles J. Nock, Pres., (Northeastern Ohio Chapter) Conversion from Personal.

*Pelron Corp., Lyons, Ill.*, Paul Pelletier, Pres., (Chicago Chapter) Conversion from Personal.

*Thermo Fire Brick Co., Sulphur Springs, Texas*, W. M. Taylor, Sales Mgr. & Asst. Gen. Mgr., (Texas Chapter).

*Newark Pattern Works, Newark, N. J.* Ernest H. Rubovitz, Pres., (Metropolitan Chapter).

### Birmingham District

G. E. Anderson, Plant Engr., *W. J. Bullock, Inc.*
Malcolm W. Baldwin, Pres., *Baldwin Foundry & Machine Corp.*
E. A. Binney, Asst. Supt., *W. J. Bullock, Inc.*
Otto Carter, Cleaning Room Fmn., *Stockham Valves & Fittings.*
Edward C. Cowgill, Fmn., Melting Dept., *U. S. Pipe & Foundy Co.*
Frank E. Harrell, Operations Trainee, *U. S. Pipe & Foundry Co.*
Henry Guthrie, Coke Engr., *DeBardeleben Coal Corp.*
Robert B. Martin, Prod. Mgr., *King Stove & Range Co.*
E. L. Perry, Owner, *E. L. Perry Rock Co.*
Sam R. Shannon, Sales, *Jefferson Brick & Supply Co.*
Eugene Sparman, Asst. Supt., Monocast Dept., *American Cast Iron Pipe Co.*
Wilmer A. Smith, Molding Fmn., *Stockham Valves & Fittings.*
V. P. Terry, Salesman, *T. H. Benners & Co.*
E. W. Wood, Consultant, *W. J. Bullock.*

### Canton District

Robert James Arn, Fmn., Foundry, *Massillon Steel Casting Co.*
Henry B. Fischer, Asst. Gen. Mgr., *Canton Pattern & Mfg. Co.*
Bernard Pizzinio, General Fmn., *Massillon Steel Casting Co.*
Fred Schmidt, Molding Fmn., *Massillon Steel Casting Co.*

### Central Illinois

Wilbur W. Dodge, Staff Engr., Plant Engineering Dept., *Caterpillar Tractor Co.*
Daniel E. Harris, Time Study Engr., *Caterpillar Tractor Co.*

### Central Michigan

Robert Hale, Dir. of Industrial Training, *Battle Creek Public Schools.*
Kenneth Hathaway, Fdry. Supt., *Three Rivers Casting Corp.*
Newton Pierce, Fdry. Fmn., *Three Rivers Casting Corp.*
Walter Taylor, Supt., Iron Dept., *Riverside Fdy. & Galvanizing Co.*
Carl G. Westerlund, Sec. Res. Mgr., *Three Rivers Casting Co.*

### Central New York

Donald Atkinson, Group Leader, X-Ray Lab., *Oberdorfer Foundries, Inc.*
Frank J. Spring, Owner, *Frank J. Spring.*

### Chesapeake

George S. Barlow, Jr., Staff Supv., *Newport News Shipbuilding & Dry Dock Co.*
Bruce B. McCleary, District Sales Repr., *Penn. Fdy. Supply & Sand Co.*

### Chicago

Marvin Glassenberg, Research Asst., *Armour Research Foundation.*
William G. Kolar, Appr., *Natl. Malleable & Steel Castings Co.*
Richard A. MacDonald, Student, *Sivyer Steel Casting Co.*
Donald M. McGowan, Sales Engr., *Metal Parts & Equipment Co.*
Robert Ward O'Brien, Rammer, *Continental Fdy. & Machine Co.*
Edward Stanek, Grey Iron Foundry Met., *International Harvester Co.*
John L. Webb, Sales Engr., *Sivyer Steel Casting Co.*

### Cincinnati District

F. M. Crawford, Pattern Dept. Supv., *Shartle Bros. Mach. Co., Div. Black Clawson Co.*
C. T. Haller, Jr., Met., *International Nickel Co.*

### Detroit

Philip Block, Salesman, *Frederic B. Stevens, Inc.*
Hugh E. Childs, Fmn., *Redford Iron & Equipment Co.*
Ray H. Moore, Consulting Engr., *Claude B. Schneible Co.*
Willard C. Suttles, Sales Engr., *Claude B. Schneible Co.*
Charles E. Wein, Met. Tester, *Ford Motor Co.*
James W. Winship, Chief Engr. Perm. Mold, *Bohn Aluminum & Brass Corp.*

### Eastern Canada

C. A. Melanson, Slsmn., *Webster & Sons, Ltd.*

### Eastern New York

Fay J. Avery, Fmn., *General Electric Co.*
Wallace R. Zink, Jr., Slsmn., *Hickman, Williams & Co.*

### Metropolitan

Malachi P. Kenney, Jr., Met., *Sperry Gyroscope Co.*
Herman J. Kistner, Pres., *Rosedale Pattern Works, Fdy. Div. Corp.*
Frank S. McCairns, Fdy. Supt., *A. P. Smith Mfg. Co.*
Robert M. McKibben, Sales Engr., *Kerchner, Marshall & Co.*
Ernest H. Rubovitz, Pres., *Newark Pattern Works.*
Roy O. Sheets, Plant Supt., *Coast Metals, Inc.*
Charles Smarsh, Pattern Fmn., *Cooper Alloy Foundry Co.*

### Mexico City

Pedro Quintanilla Ducland, Mgr., *Industrial de San Bartolo, S. A. de C. V.*
Crispin Martinez Millan, Mgr. & Owner, *Taller Mecanico M. Tarrago.*
Alvaro Martinez Perez, Engr., *Fundiciones de Hierro Y Acerro, S. A.*

### Michiana

Thurlow S. Carter, Owner, *Square Deal Pattern & Foundry Co.*
J. E. Doster, Secy. & Treas., *Casting Service Corp.*
Joseph A. Lazara, Standards Control Engr., *Sibley Machine & Fdy. Corp.*

### Mo-Kan

Alex Mahood, Jr., Salesman, *Black Sivalls & Bryson, Inc.*

### Quad City

Theodor Redin, Mgr., *Wm. Demmler & Bros.*
William S. Richmond, Fdy. Engineering Appr., *J. I. Case Co.*
Harry L. Ringstrom, Asst. Mgr., *Wm. Demmler & Bros.*

### Saginaw Valley

William S. Hackett, Fmn., *Central Foundry Div., G.M.C.*

### St. Louis District

James W. Baldwin, Met., *Sterling Steel Casting Co.*
Robert C. Brooke, *Luria Bros. & Co.*
A. S. Cogan, Project Engr., *Western Cartridge Co.*
Louis Gerlach, Gen. Fmn.—Gray Iron Fdy., *American Car & Foundry Co.*
Frank E. Harness, Chief Met., *Gardner-Denver Co.*
Charles R. Shive, Engr., *Sterling Steel Casting Co.*

*Continued on page 208*

*Announcing*

the first showing of

# FREMONT'S
# *New*
# SPREADLOCK FLASK

*at the*
*International Foundry Congress*
*and Show*

MAY 1-7, ATLANTIC CITY

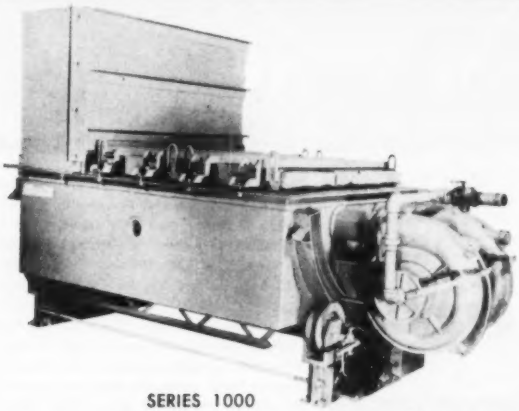
***Be sure to see this new flask in booth 433.***

**THE FREMONT FLASK CO.**

**FREMONT** • **OHIO**

# SUPERIOR

- PERFORMANCE
- ECONOMY

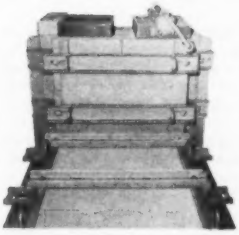


SERIES 1000

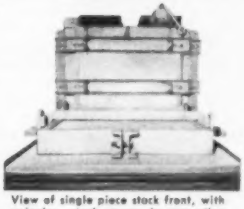
# REDA

## REFLECTING TYPE STACK LOADING DIRECT FIRED MELTING

# FURNACE

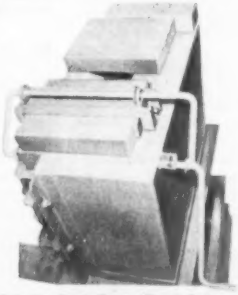


One-piece stack front and one piece roof. Provides easy access to lining for maintenance.



View of single piece stack front, with swinging stack cover in operating position.

Swinging Stack Cover—Open Position and showing ease with which furnace may be charged.



Swinging Stack Cover—Closed Position. This position when furnace is in operation.

| SERIES | CHARGE IRON | CHARGE BRONZE | MELT CAP./HR. IRON | MELT CAP./HR. BRONZE |
|---|---|---|---|---|
| 400 | 400# | 450# | 800# | 1350# |
| 550 | 550# | 625# | 1100# | 1875# |
| 1000 | 1000# | 1125# | 2000# | 3375# |
| 2000 | 2000# | 2250# | 4000# | 6750# |

LARGER MODELS ON REQUEST

**Performance and economy are the keynotes of the new Reda Reflecting Type Direct Fired Melting Furnace for ferrous and non-ferrous metals. Advantages sought by all foundry owners, both large and small, are inherent in these cleanly designed, highly efficient furnaces.**

***These advantages will be yours with a Reda Furnace:***

1. **Low First Cost.**
2. **Fast Heat — High Heat: 30 minute preheat; full charge gray iron ready to pour 25 minutes after charging; full charge brass or bronze ready to pour 15 minutes after charging.**
3. **Operating Economy: Highly efficient fuel mixer and proper chamber design provide lowered fuel costs.**
4. **Greatest number of heats without interruption.**
5. **Maintenance: New type lid allows quick and easy entry to furnace for refractory maintenance.**
6. **Low decibel noise level.**
7. **Will best comply with health requirements of intra-city installation.**

### GAS OR OIL FIRED

**The new Reda Burner arrangement can operate from both fuels simultaneously or be switched from one fuel to the other in an instant.**

***Phone or Write for Complete Details***

**SEE OUR BOOTH No. 1118 AT THE CONVENTION**

# REDA PUMP CO.

BARTLESVILLE, OKLAHOMA

Old timers in the patternmaking field honored at Rochester Chapter's "Pattern Night" were, left to right: Arthur Spindler, City Pattern Works, 30-year veteran; Harold Wilshaw, DeRoller-Wilshaw Pattern Works, 30 years; John Steeves, Corbett-Steeves Pattern Works, 55 years; Raymond Schwartz, Genesee Pattern Works, 30 years; and Charles Benedict, Benedict Pattern Works, 38 years. Total patternmaking experience of group shown is over 145 years.

# chapter news

## Saginaw Valley

KENNETH H. PRIESTLEY
*Vassar Electroloy Products, Inc.*

January 3 meeting was made up of three simultaneous round table sessions on Iron, Light Metals and Steel, and a program-opening film on production of jet engines for the Air Force.

Iron session, as reported by R. H. Klawuhn, General Foundry Co., had as its speaker and discussion leader Howard H. Wilder, Vanadium Corporation of America. Topic was *"Metal Controls for Iron,"* stressing the need for better controls and processing.

Among recommendations brought out were: simple casting design, good laboratory practice and controls, cooperation between departments, careful choice of raw materials, good cupola bed construction, good coring practice, uniform gating and risering, ladle standardization, and rigid inspection.

Steel session, reported by Len Cline, Saginaw Foundries Co., took up the topic, *"Steel Castings As We Want Them,"* in which A. H. Schloz, E. W. Bliss Co., Toledo, Ohio, was the leader.

Mr. Scholz told of the inroads weldments have made upon the steel castings industry. This can partially be overcome, he said, by improving the surface appearance of castings. He also discussed SFSA's proposed *"Minimum Standards for Steel Castings."*

Other topics taken up were: marking of patterns and closer relationships between designers and foundry engineers.

Reported by Marshall Chamberlain, Dow Chemical Co., the Light Metals session had as its leader P. G. DeHuff, Aviation Gas Turbine Div., Westinghouse Electric Corp.

Topics discussed included use of light metals in aircraft jet engines, particularly of magnesium. Mr. DeHuff complimented the foundry industry on the uniformly good quality, dimensional accuracy and surface finish of castings used by his firm. The speaker recommended that the foundry industry simplify its casting designs by establishing close liaison with the customer's design engineers.

Also discussed was a new protective treatment for magnesium casting surfaces developed by Frankfort Arsenal.

Western Michigan foundrymen gathered around January 7 speaker Albert F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, (extreme right) with questions on patternmaking. From left: C. H. Cousineau, William Geisler, Gerrit Witt, Jerry Wallaston, George Cannon, Jr., Chapter Chairman Ross P. Shaffer, and Mr. Pfeiffer.

## Northern California

CHARLES R. MARSHALL
*Industrial Foundry Supply Co.*

February 11 meeting, held at the Hotel Shattuck, Berkeley, featured a talk by Clyde A. Sanders, American Colloid Co., Chicago, on research at Michigan State College to determine effects of sand mixes on shrinkage. Mr. Sanders accompanied his talk with a motion picture and several slides on the subject.

A message from the Northern California Patternmakers Association relative to the drafting into the Armed Services of apprentice patternmakers was read and commented upon by Chapter President Philip C. Rodger.

## Southern California

ALFRED A. GRANT
*Grant & Co.*

More than 135 foundrymen attended the February 8 meeting to hear Clyde A. Sanders, American Colloid Co., Chicago, speak on *"Foundry Sands."*

The talk was directed mainly to control of degree of metal shrinkage .by proper use of molding sand. Mr. Sanders discussed the effects of various molding materials and their relation-

ship to either overcoming or helping to produce casting defects. Factors found to be of most importance, especially in gray iron castings, are the sand and binder used, amount of ramming, moisture content, and temperature. Mr. Sanders pointed out that the greatest shrinkage problem is caused by over-tempered sands.

Mr. Sanders used a film prepared in collaboration with Michigan State College and Buick Motors. The film showed testing of molding sand under rigid control of binder, moisture, ramming and temperature. Three identical molds were cast to illustrate the problem of shrinkage.

In the first mold, southern bentonite was used as the binder; in the second, pitch was used; in the third, seacoal and wood flour were used. After pouring, it was found that the third mold, made with seacoal and wood flour as binder, showed the least shrinkage. It was also shown that excessive ramming caused blowing as well as shrinkage. It was discovered through these tests that an addition of 6 per cent more seacoal in sand mix caused less shrinkage in both the first and second molds poured.

Also on the agenda was presentation of awards in the Chapter's Apprentice Patternmakers Contest. First prize of $25.00 was won by William Campbell of Campbell & Matyshak, Whittier, Calif. Second prize of $15.00 was won by Donald Bonk, Firestone Pattern Works, and third prize by Lee Sanders, Santa Monica Technical School.

**Topics of mutual interest held the attention of (from left) Prof. C. C. Sigerfoos, Michigan State College; Sat Brat Gupta of Delhi, India, foundry student at Michigan State; and A.F.S. National Vice-President Elect Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., at Central Michigan Chapter's January 16 meeting, Battle Creek.**

## Central Indiana

PAUL V. FAULK
*Electric Steel Castings Co.*

Some 120 foundrymen attended the February 4 meeting at the Athenaeum, Indianapolis, to hear C. T. Marek, associate professor of Manufacturing Processes, Purdue University, speak on *"Casting Design for Economical Production in Engineering Curricula."*

Opening his talk, Professor Marek first asked that anyone present having a case history of a redesigned casting give it to him for incorporation in his teaching program for engineering students. This he said, would help break down the problem of designing castings that are not properly foundry jobs.

He went on to show slides supporting his stand on economical casting design. He explained that sometimes the best foundry design was not necessarily the most economical in the total manufacturing process. In these cases a designing engineer with foundry training could decide the best possible way to do the job.

A.F.S. National Vice-President I. R. Wagner gave a short talk on the coming convention and explained the reasons for choosing Atlantic City as a convention site. First, he said, Atlantic City has the only convention hall in the world that could house all the exhibits on one floor. Second, Atlantic City has plenty of hotel space to handle everyone. Third, the convention hall has ample lecture rooms to handle all technical sessions at one time.

**Speaker at Philadelphia Chapter's Management Night, held on March 13, will be Rear Admiral Homer N. Wallin, U. S. Navy, Chief of the Bureau of Ships, Washington, D. C. In charge of maintenance and salvage of ships in the South Pacific in World War II, Admiral Wallin was later put in charge of Norfolk Naval Shipyard and was responsible for refloating the Battleship Missouri after it ran aground in 1950.**

**Headliners at Southern California Chapter's January 11 meeting were Technical Chairman Harold G. Pagenkopp, Angeles Pattern Works, Los Angeles, and speaker of the evening William Romanoff of H. Kramer & Co., Chicago. Photo by Ken Sheckler, Calmo Engineering.**

## Chicago

DEAN VAN ORDER
*Burnside Steel Foundry Co.*

Two speakers were featured at the February meeting—Ralph L. Lee of General Motors Corp., Detroit, and William T. Bean, Jr., Detroit foundry consultant.

Mr. Lee's *"People as They Come and Are"* was a very appropriate coffee talk. Human elements are not easily measured, since everyone is different and most likely is the only one of his kind, Mr. Lee said.

In this modern age of machines and mechanical production, people are still the real problem in the foundry. If management would remember these things when dealing with people, a high level of employee relations could be maintained, Mr. Lee concluded.

Mr. Bean emphasized the importance that customers of the steel foundries are giving to test bars but said that in his opinion the test bar is not the final

*continued on page 160*

# YOU'LL SEE THESE DAVENPORT MOLDING MACHINES IN ACTION

## "DAVENPORT" JOLT ROLL OVER DRAW MOLDING MACHINE

See this powerful ROLL-OVER which is FULLY ENCLOSED for mechanical protection, with Centrally located control column, Balanced roll over arm, Positive air operated flask clamps, Automatic flask leveler, Accurate positive draw, Automatic lubrication, Valveless jolt, Self-cleaning striking pads and many other features.

## "DAVENPORT" JOLT STRIPPER PIN-LIFT

See—so that you can evaluate this versatile "Davenport" PIN-LIFT molding machine with Adjustable lift pins, Valveless jolt, Self-cleaning striking pads, Adjustable precision draw, Automatic lubrication and many other features. A machine that can produce drag molds as well as copes.

## "DAVENPORT" JOLT SQUEEZE PIN-LIFT

See this machine that is brand new to the foundry industry. The Swing arm, the Screw adjustment for fast job change, the Electrically controlled squeeze, Automatic lubrication, Valveless jolt, and many other features which make this JOLT SQUEEZE STRIP machine so outstanding.

## BOOTH 1449

**INTERNATIONAL FOUNDRY SHOW**

## MAY-1-7-1952

**AMERICA'S OUTSTANDING FOUNDRY MOLDING MACHINES**

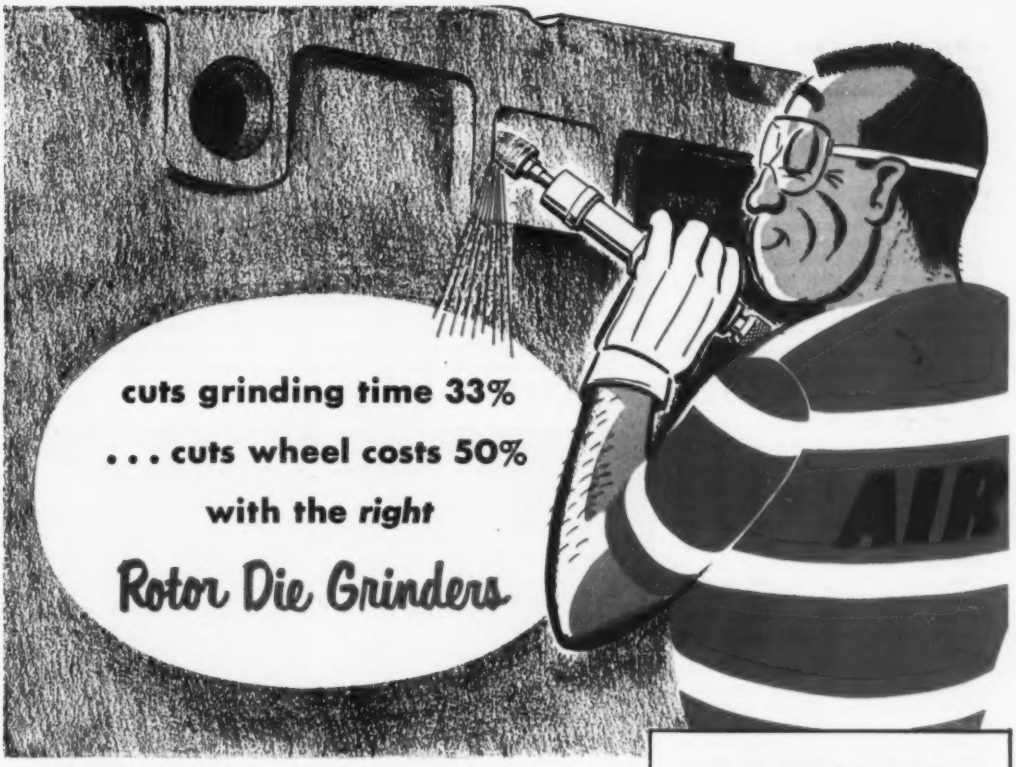
**If YOU ARE unable to attend the show, let us send you our catalog.**

**DAVENPORT MACHINE AND Foundry Company**
DAVENPORT IOWA U. S. A.

CANADA
Canadian Foundry Supplies & Equip. Ltd.
Toronto and Montreal

REPRESENTATIVES
FRANCE • BELGIUM • HOLLAND • LUXEMBURG • SWITZERLAND
Ph. Bonvillain & E. Ronceray, Choisy-Le-Roi
Rue Paul Carle, Seine, France

ALL OTHER FOREIGN COUNTRIES
R. K. Price Associates, Inc.
70 Pine St., New York 5, N. Y., U.S.A.




HERE'S how Rotor Tool engineering assistance helped a New England manufacturer of large machine tools:

**PROBLEM:** Getting into recesses, corners, contours in large machine tool castings of high carbon steel. Finish was important. Used large cone wheels at 6000 R.P.M. Average weight of grinders was 12 to 13 lbs. Hard to control on small contours.

**SOLUTION:** Rotor Application Engineer recommended Rotor M-871 Short Spindle Die Grinder at 17,000 R.P.M., using small cone wheels. Tool weight is only 4 lbs. 10 oz., permitting faster, easier handling.

**RESULTS:** High-speed, light-weight Rotor Grinders have cut grinding time 33%. Saves 50% in wheel costs. Cut operator fatigue.

Rotor Application Engineers can demonstrate savings on *your* job. Write for Catalog No. 38.

AIR O'TOOL

**281 ROTOR MODELS...**

***The right grinder for your job!***

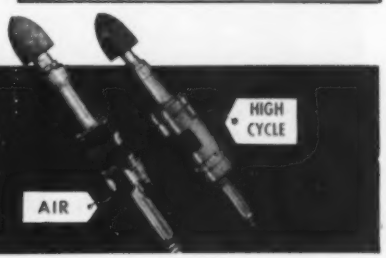
**SPEEDS**...21,000; 20,000; 17,000; 12,000 and 8,000 R.P.M.

**COLLETS**...¼"—⅛"—⅛"—½" (for abrasive sticks)

**WHEEL ARBORS**...For wheels ½" and ⅜" in thickness, cone wheel adapters—also extensions.

**SPINDLES** . . . Short and long spindles.

**HANDLES**...Lever, twist, snap and sleeve.




THE ROTOR TOOL CO.
CLEVELAND, OHIO

guide. Analysis of test bars could be changed and the test bar does not have to stand up under the same working conditions as a casting.

Mr. Bean said that foundrymen in general do not collect enough facts on material they purchase so as to tell the customer what he is getting in his castings rather than what he should get.

The casting designer and foundry engineer both could do a lot to remove stresses and strains if they would use some new methods developed through use of stresscoat and strain gages.

**Honored at Rochester Chapter's "Secretaries' Night" were members of this quartet, all of whom have held that position. From left, First Chapter Secretary Donald Webster, Second Secretary Carl Johnson, Third Secretary Leon C. Kimpal, and Present Secretary D. M. Wilson.**

## Rochester

HERBERT G. STELLWAGEN
*Hetzler Foundries, Inc.*

Wesley C. Stott's premier preview of the motion picture, *"Master of Fire and Servant of Industry,"* provided the chapter with an interesting and exciting evening, February 5.

Via this color-sound picture, the audience was shown manufacture of firebrick and refractory materials from mine or pit to the installation of final products.

Bricks made by dry press, stiff mud and hand mold process were thoroughly and clearly pictured. Mining of pit clay and handling, processing and blending of raw materials for the production of quality refractory products were shown. Bricks and clay, Mr. Stott said, are made to withstand temperatures up to 3,200 F. Plastic linings for cupolas, large ladles and hand ladles providing long life, were manufactured before the viewers.

**Headliners at Saginaw Valley Chapter's February 7 meeting were from left: Kenneth H. Priestley, Vassar Electroloy Products Co.; Doctor Haake, evening's speaker; and Chapter Secretary F. James McDonald, Central Foundry Division, GMC.**

## Texas

F. M. WITTLINGER
*Texas Electric Steel Castings Co.*

The February 15 meeting was held in the Ben Milam Hotel, Houston. T. E. Barlow, Eastern Clay Products Dept., International Chemicals & Minerals Corp., Jackson, Ohio, spoke on *"Casting Defects as Related to Foundry Sand"*. Those in attendance considered this one of the best meetings held in some time, as Mr. Barlow restricted his talk to defects from improper sand conditions rather than trying to cover the subject too broadly.

An open house was held by the Cleco Div. of Reed Roller Bit Co., Houston, and many of the members took advantage of the opportunity to watch pneumatic tools being manufactured.

In order that a greater number of Texas foundrymen can have the benefit of participating in the technical subjects, the chapter is working out a plan whereby certain areas will hold meetings which will not conflict with the regular chapter meetings. On February 18 the first of such meetings was held in Houston at the auditorium of Hughes Tool Co. The film *"A-D-M of Cores"* was followed by a discussion period. Forty attended, almost all operating men.

**Members of Oregon State College Student Chapter photographed during a recent field trip through Rich Manufacturing Co., Portland, Ore.**

## Eastern Canada

A. E. CARTWRIGHT
*Crane, Ltd.*

"Bring Your Boss" was the slogan for the February 8 meeting at the Mount Royal Hotel, Montreal. A most successful meeting resulted when many members brought their top company executives.

The usual chapter directors' dinner-business meeting preceded the general meeting and each director brought a guest executive.

Later, as a result, there was a capacity audience at the general meeting to hear Bruce L. Simpson, National Engi-

# "OH MY ACHIN' BACK"

## at $ Per Day Per Back

***Cut Non-Productive Time with Ajax Lo-Veyors***

One of your *few remaining ways* to pare down your rising costs is to cut your materials handling costs. Today, more than ever before, non-productive time and overhead is of vital concern.

Ajax Lo-Veyors are helping foundrymen speed up sand handling between departments, between machines and between operations. Ajax Lo-Veyors provide automatic, trouble-free handling, scalping, and separation of sand, sprues, core wires and other foundry materials.

Write for facts on the advantages of Ajax Vibrating Conveyors.

AJAX

LO-VEYORS

SEE AJAX LO-VEYORS IN OPERATION AT THE SHOW IN ATLANTIC CITY BOOTH 1547

AJAX FLEXIBLE COUPLING CO. INC. • WESTFIELD, NEW YORK

# 2-WAY PROTECTION FOR MAGNESIUM FIRES

## PREVENT FIRES IN POURING AND HEAT-TREATING OF MAGNESIUM . .

. . . INSTALL AN **ANSUL** POSITIVE CONTROL $SO_2$ SYSTEM

The danger of fire is a constant threat in pouring and heat treating of magnesium. . . . you can reduce this ever present danger by installing:

1. An Ansul $SO_2$ System for mold flushing immediately before pouring, and
2. An Ansul manually controlled $SO_2$ system to maintain positive control of a protective atmosphere in your heat treating ovens.

The use of Ansul $SO_2$ Systems reduces the fire hazard by preventing oxidation, reaction and ignition of magnesium and its alloys during pouring and heat treating operations.

Ask for your copy of bulletin No. A 940. In addition you can also obtain the services of one of Ansul's Chemical Engineers without cost or obligation. He will gladly cooperate with you in developing systems for your foundry.

## EXTINGUISH FIRES IN THE CLEANING & MACHINING OF MAGNESIUM CASTINGS

USE

## ANSUL MET-L-X DRY POWDER FIRE EXTINGUISHERS

MODEL MX 30-A

Ansul Met-L-X Dry Powder Extinguishers are designed to allow safe application of a special extinguishing compound for burning metal fires.

Ansul Met-L-X Dry Powder is particularly effective when applied to magnesium turnings, chips and castings.

Get the facts. Write for File No. 695. You will receive complete information and other valuable data.

**ANSUL**
**CHEMICAL COMPANY**
**MARINETTE • WISCONSIN**

MANUFACTURERS OF INDUSTRIAL CHEMICALS • DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT • REFRIGERANTS AND REFRIGERATION PRODUCTS
DISTRIBUTORS IN ALL PRINCIPAL CITIES IN THE U.S.A., CANADA AND OTHER COUNTRIES


neering Co., Chicago, give a most engaging talk on *"Development of the Metal Castings Industry."* The speaker held the attention of the audience completely and was tendered a vote of thanks.

## Southern California

ALFRED A. GRANT
*Grant & Co.*

International Night, January 11, opened with A.F.S. National Director A. M. Ondreyco of Oakland, Calif., describing the forthcoming A.F.S. International Foundry Congress & Show. Featured speaker for the meeting was William Romanoff, H. Kramer & Co., Chicago, whose topic was *"Brass and Bronze Foundry Practice."*

He stated that the ultimate test of an alloy is whether or not it will give a good casting; that in order to determine this an analysis of existing losses and their causes must be made. Items to be considered in order of importance, he said, are: gating, pouring temperature, melting practice, sand, defective pattern equipment, and metal.

Mr. Romanoff then described the various steps used to produce ingots from scrap metal. Briefly, they are: (1) sorting for quality and removal of impurities; (2) melting; (3) refining by oxidation for from 3 to 13 hours; (4) pouring into ingot molds.

Occasional foundry tests for quality must be made to determine whether a run is producing satisfactory castings or not, he said. The best test is the fracture test, though chemical analysis and the stress test are also used.

Mr. Romanoff recommended that records be kept on each casting job concerning pouring and incident problems, to save time on future runs of the same casting. This will make the loss analysis easier.

Where high shrinkage alloys are used, it is best to pour a test plug in sand. If the metal rises, then the melting atmosphere is incorrect and phosphorus copper should be added to increase fluidity.

Mr. Romanoff in conclusion described the elements making up various metals used in the National Defense.

## Eastern New York

ROBERT A. REGE
*Eddy Valve Co.*

The February 19 meeting held at Circle Inn, Latham, featured a talk by Lawrence D. Pridmore, International Molding Machine Co., Chicago, on *"Core and Mold Blowing"*. Mr. Pridmore stressed the need for proper vents in core boxes and large enough blow holes for the type of sand used and type of core to be blown.

At a short directors' meeting following the chapter meeting, Scott Mackay, Rensselaer Polytechnic Institute, Troy, reported on the FEF meeting he had just attended in Cleveland.

## Northwestern Pennsylvania

ROY A. LODER
*Erie Malleable Iron Co.*

The January 28 meeting was held in the Blue Room of the Erie Moose Club, with the largest dinner reservation to date. Chairman J. Douglas James, Cooper-Bessemer Corp., Grove City, reported on the directors' meeting and introduced two new members.

Speaker was J. A. Wickett, Monsanto Chemical Co., Springfield, Mass., who spoke on shell molding. Using slide pictures, Mr. Wickett discussed not only the process itself, but certain advantages, limitations, and potential impact on the foundry industry. He said that in using the best equipment possible they claim to get better results as to finish and size. With the mechanized equipment he showed, they can produce more castings with less finishing. He also stated that in some cases machining can be entirely eliminated. Shell molding should be applied only to production items which would warrant the cost of expensive gray iron patterns. He also touched on sand and resin mixtures, pouring, and backing. After the lecture, there was a question and answer session that lasted nearly two hours.

## Ontario

C. A. THOMPSON
*Galt Malleable Iron Co. Ltd.*

Scene of the February 22 meeting was the Royal York Hotel, Toronto. S. C. Massari, technical director of A.F.S., delivered an informative and interesting lecture on "*Gating and Risering*". The film "*Fluid Flow in Transparent Molds—II*" was shown, followed by a question and answer period presided over by Mr. Massari. Technical chairman was John Allan, Callander Foundry and Mfg. Co., Ltd., Guelph, Ont.

This meeting was in honor of the past

**Looking over samples of shell molds during Central Illinois chapter's February meeting are from left: A.F.S. National Director Frank W. Shipley, Caterpillar Tractor Co., Peoria; speaker Richard Herold, Borden Co., New York; and A.F.S. National Director James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Photo by Fred Brosmer, Caterpillar Tractor Co.**

**Officers and directors of the Tennessee chapter conferring with A.F.S. Vice-President I. R. Wagner at a meeting held just prior to the Southeastern Regional Foundry Conference. Left to right: Charles Chisolm, Wheland Co.; W. M. Hamilton, Crane Co.; Mr. Wagner; Karl Landgrebe, Wheland Co.; Porter Warner, Jr., Porter Warner Industries, Inc.; Lester Bealer, American Brake Shoe Co.; and S. C. Northington, Combustion Engineering Co.**

**Old Timer's table at the February meeting of Central New York Chapter represented more than 280 years of service to the foundry industry. Left to right: George Stanton, Sr., Stanton Foundry; H. J. Skidmore, International Harvester Co.; E. Groves and H. Groves, Oriskany Malleable Iron Co.; F. F. Shortsleeve, Shortsleeve Foundry; Frank Breese and Raymond Burch of Sweet's Foundry Co.; and Curtis M. Fletcher of the Fairbanks Company.**

**Three generations of patternmakers are pictured in this family portrait taken during Rochester chapter's "Pattern Night" on March 4. Shown are, from left: John Kenneth Steeves, father; John F. Steeves, grandfather; and son John Kenneth Steeves, Jr. The Steeves family pictured here represents 97 years of making patterns for the foundry industry.**

**Chapter Photographer Lou Lund of Archer-Daniels-Midland Co.'s Foundry Products Division snapped Twin City chapter's February 12 meeting principals. From left: Chapter Chairman C. Fred Quest, J. F. Quest Foundry Co.; Speaker Richard Herold, The Borden Co., New York; and Vice-Chairman J. W. Costello, American Hoist & Derrick Co.**

**Oregon State College Student Chapter members looking over molds during a visit to Electric Steel Foundry Co., Portland, Ore., January 12. From left: Jayatissa deMel, exchange student from Ceylon; Delbert Blanchard, Charles Utterbeck; John Meece of Electric Steel Casting Co.; David Schnebly and Howard Ostrin. Photo by Norman Hall, Electric Steel Foundry Co.**

chairmen, all of whom were seated at the head table.

J. J. McFadyen, Galt Malleable Iron Co., Galt, Ont., A.F.S. national director, outlined various aspects of the 1952 Foundry Congress at Atlantic City, N. J., May 1-7, and reported on the progress made for this event.

## Oregon State College

ALVIN P. SCHOCK
*Oregon State College*

On February 9 the chapter went on a field trip through the Rich Mfg. Co., Portland. They were shown through the plant by E. J. Hyche, vice-president of the company, with the assistance of the departmental foremen who volunteered their time. Members were shown how soil pipes and soil pipe joints were rammed. Also shown was the sand laboratory, cleaning department, pipe dipping vats, and cupola. The cupola was carefully discussed, and reports of previous charges and records of heats were compared to show how carefully controlled heat can increase efficiency output.

## Chesapeake

JOSEPH O. DANKO, JR.
*Arlington Bronze & Aluminum Corp.*

The foundry sand school course given by Frank S. Brewster of the Harry W. Dietert Co., Detroit, was attended by over 50 representatives of 15 different companies. Course was held at Johns Hopkins University, Baltimore, February 25-27. Mr. Brewster made an excellent presentation of the properties and testing of various foundry sands.

## Central Illinois

G. F. LLOYD
*Brass Foundry Co.*

The February meeting, held at the American Legion Home, Peoria, Ill., was attended by 140 members. Ralph Beebe, International Harvester Co., Canton, Ill., introduced the speaker, Richard Herold, Borden Company, New York. Mr. Herold's interesting subject was *"Shell Molding"*.

He stated that this process will not replace sand and die cast molding but is applicable to various types of castings, and that it is possible to produce castings with a tolerance of 0.002 to 0.003 in. per in. He then presented sample molds for inspection, after which a lively discussion period was held.

## Central Michigan

RICHARD H. DOBBINS
*Albion Malleable Iron Co.*

On February 20, the regular monthly meeting was held at Hart Hotel in Battle Creek. Chapter chairman Thomas T. Lloyd, Albion Malleable Iron Co., Albion, Mich., presided at a short business meeting, and expressed appreciation for the fine work being done by the Membership Committee.

Dr. A. J. Smith of Michigan State

# Automatic Sand Preparation and Handling Increases Mold Output 35%

**Sand Travels From Shakeout to Flask Without Shoveling—Using REDDY SANDY & HANDY SANDY**

The Nelson Foundry Co., Morton Grove, Illinois, has increased their production 35% by using a combination of 3 Reddy Sandys and 3 Twin Hopper Handy Sandys. These units make sand conditioning and handling practically automatic thereby saving many manhours in the production of Brass and Aluminum Pressure-Tight castings. It is only necessary to dump the molds on the vibrating shakeout deck of the Reddy Sandy. The sand continues automatically through screening, magnetic separation, tempering and a double aeration until it is deposited in the hopper of the Handy Sandy for convenient use by the molder.

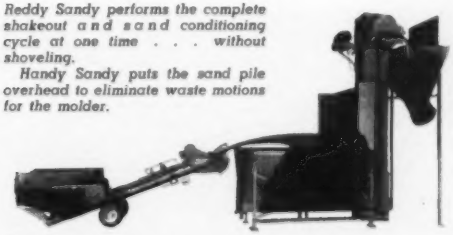
Mr. Wilbert K. Nelson, General Manager says: "To date we have encountered no hot sand problems as might be expected from these closely coupled units. The watering device has worked efficiently and sand is furnished to the molder in better condition than ever before.

"Our production has increased impressively especially on large molds, and in addition the molders and shakeout men are well pleased and less tired than formerly.

"To turn out the tonnage we are now able to produce would take twice the floor space with our former method of operation."

*Reddy Sandy performs the complete shakeout and sand conditioning cycle at one time . . . without shoveling.*

*Handy Sandy puts the sand pile overhead to eliminate waste motions for the molder.*



SEND FOR YOUR COPY OF THE NEW CATALOG: "PLANNED MECHANIZATION FOR FOUNDRIES." AIRMAIL YOUR REQUEST TODAY.

## NEWAYGO ENGINEERING COMPANY

**newaygo, michigan**

***Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment***

**Speakers' table at Central Michigan chapter's February 21 meeting included, left to right: David Boyd, Engineering Castings, Inc.; Collins L. Carter, Albion Malleable Iron Co.; Austen J. Smith, Michigan State College; Ralph L. Lee, Grede Foundries, Inc., Milwaukee, evening's speaker; John E. Wolf, Midwest Foundry; Richard K. Moore, Foundries Materials Co.; William E. Rubb, A. P. Green Fire Brick Co.; and Roy W. Miller, U. S. Foundry Corp.**

**Winners of Metropolitan chapter's Apprentice Contest pictured here are, from left: Russell Brown, New York Naval Shipyard (1st Non-Ferrous Molding); Stephen Gorto, Barnett Foundry & Machine Co. (1st Gray Iron Molding); Victor Glinoweicke, Cooper Alloy Foundry Co. (2nd Steel Molding); and Steve Matviyetz, Cooper Alloy Foundry Co. (1st Patternmaking). Winners not shown include Walter Turrentine, New York Naval Shipyard (1st Steel Molding); Robert Garvey, Curtiss Wright Corp. (2nd Patternmaking); and Irwin Sacks, New York Naval Shipyard (2nd Non-Ferrous).**

College, acting as technical chairman for the meeting, introduced Ralph L. Lee, Grede Foundries, Inc., Milwaukee, as guest speaker. His topic was "*Foundry Cost Methods*". He conducted the session with complete audience participation; in this way, individual foundry problems were studied and suggestions made as to cost accounting procedures. Mr. Lee urged a free exchange of ideas between foundries and suggested that foundries make every attempt to sell all castings by the piece. A very active discussion followed, with Mr. Lee explaining the reasons for a standard practice of this sort.

## Saginaw Valley

ROY S. DAHMER
*Eaton Mfg. Co.*

The first annual ladies' night was held February 7 at Frankenmuth, with 350 people attending. Musical entertainment was supplied by Miss Gertrude Garvin. Orchid corsages were presented to the ladies.

The speaker was Dr. Alfred P. Haake, consultant for General Motors Corp. and mayor of Park Ridge, Ill. He was introduced by R. Verne Righter, Central Foundry Div., General Motors Corp., Saginaw. Subject was "*Management—Key to Progress*". Dr. Haake stressed honesty as a primary requirement and pointed out that management is simply the ability to get people to do what they should without having to ask them to do it.

## Metropolitan

W. T. BOURKE
*American Brake Shoe Co.*

The February 4 meeting was devoted to a question and answer session on foundry problems, the questions being answered by a panel composed of the following: Discussion Leader, William H. Ruten, Polytechnic Institute of Brooklyn; Sand, G. M. Etherington, American Brake Shoe Co., Mahwah, N. J.; Light Alloys, Anthony Cristello, American Light Alloys, Inc., Little

*continued on page 172*

**Speakers' table at Canton District Chapter's March 6 meeting included, left to right: A.F.S. National Director V. J. Sedlon, Master Pattern Co., Cleveland; A.F.S. National Secretary-Treasurer Wm. W. Maloney; Frank G. Steinebach, Penton Publishing Co., Cleveland, evening's speaker; Chairman C. B. Williams; and Vice-Chairman Alexander O. Prentice.**

OREFRACTION
ZIRCON
SAND
AND
FLOUR
Orefraction Inc.
7425 THOMAS ST., PITTSBURGH 8, PA.

## *Here's your* PREVIEW *of the*

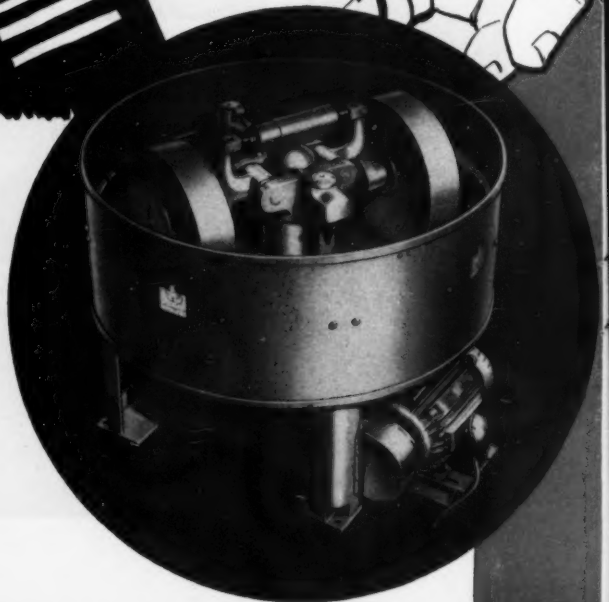
# NATIONAL OPERATING EXHIBIT

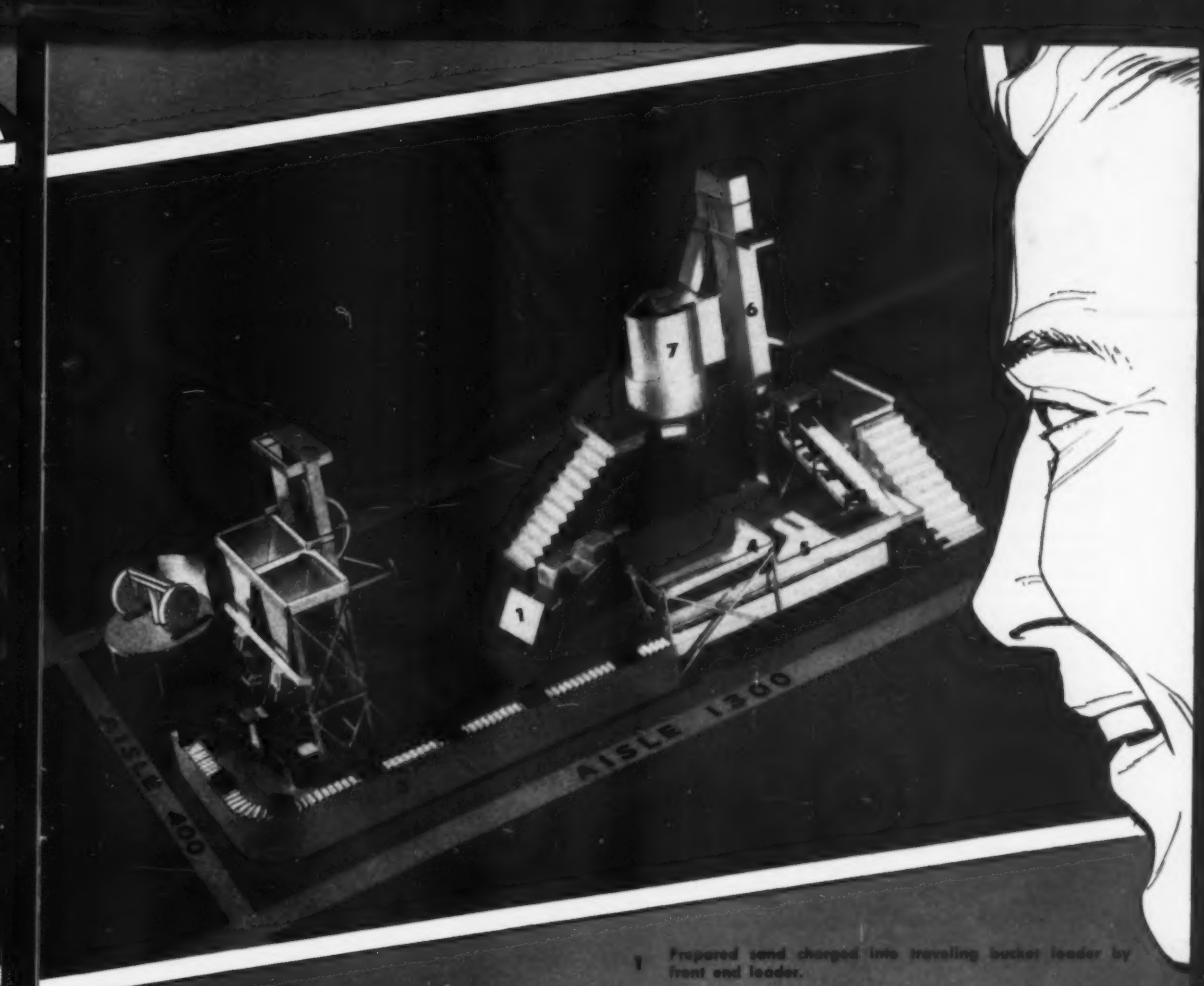
## *...see it at the* 1952 FOUNDRY SHOW

**. . . featuring the New 2F and 3F SIMPSON Intensive MIX-MULLERS**

Forming the "heart" of the National sand preparing system which will be in actual operation at the Foundry Show, will be a new 2F Simpson Mix-Muller, complete with National Cooling Hood, National Aerator, and Automatic Time Master Controls . . . demonstrating the way in which these modern, high capacity mullers are doing a bigger, better sand preparing job for foundries across the nation.

In addition, a 3F Simpson Mix-Muller will also be displayed, with crib sections cut away to show every detail of the new, efficient spring-loaded muller design and construction . . . most outstanding feature that has been developed since the inception of mulling.






ILLUSTRATED above is an actual scale model of the *National Utility Unit* which will be in full scale operation at the 1952 Foundry Show.

The unit will demonstrate how foundry sand preparation, molding and shakeout operations can be modernized with a mini-mum of mechanization, but with maximum flexibility for future addition or expansion.

This is your opportunity to see the new 2F and 3F Simpson Mix-Mullers and National Utility Unit in action . . . and remember, what you see can be engineered for *your* needs!

*We'll be looking for you in Atlantic City, May 1-7.*

1. Prepared sand charged into traveling bucket loader by front end loader.
2. Bucket loader charges overhead molders heppers which deliver sand to 2 molding machines.
3. Finished molds delivered to shakeout on roller conveyor.
4. Shakeout sand delivered to receiving hopper by front end loader.
5. Shakeout sand is automatically screened and magnetic refuse removed by screening and conveying unit.
6. Shakeout sand delivered by inclined belt and elevator to batch holding hopper over 2F Mix-Muller.
7. Preparing equipment consists of 2F Mix-Muller equipped with National Cooling Head, Aerator and Automatic Time Master Controls, which will control charging of sand, water, binder, cooling and mixing cycle, and discharge of prepared sand through aerator. National Time Master operation will be visually demonstrated by means of a flashing light panel.

**National Engineering Company**

**600 Machinery Hall Bldg. • Chicago 6, Illinois**

**SIMPSON**
*Intensive*
**MIX-MULLERS**

# foundry tradenews

**Claude B. Schneible Co.** has opened new executive offices at 212 Stephenson Bldg. on the corner of West Grand Blvd. and Cass, Detroit. Sales, advertising, and accounting will all operate from this office. Engineering, production, and purchasing will continue to function from the plant at 2827 25th St., Detroit.

**International Nickel Co. of Canada, Ltd.,** announces the completion of a 7½-mile pipeline through which the bulk concentrate from 3,650,000 tons of nickel-copper ore is being pumped annually from its Creighton concentrator to its reduction plants at Copper Cliff, Ont., Canada.

**Basic Refractories Inc.,** Cleveland, has erected a 122-ft stone storage silo at Maple Grove, Ohio. Housing 12 bins, the silo will store about 10,250 tons of No. 6 stone (⅜ in.) plus considerable raw material. The stone quarried at Maple Grove is almost chemically pure dolomite.

**Iroquois Foundry Co.,** Racine, Wis., announces the appointment of August C. Vierthaler as its president. Mr. Vierthaler was vice-president for many years. Walter A. Vierthaler is assuming the position of vice-president. A. J. Schmidbauer remains in charge of scheduling and sales; he will also be secretary. Roy Ruland will continue as treasurer.

**Raybestos-Manhattan, Inc.,** Passaic, N. J., is now using the world's largest laboratory conveyor belt testing machine. Any 30-in. wide, 80-ft length of belt can be subjected to 200,000 lb total tension. Recorders trace power input, stretch, tension, and speed at rates to 2000 fpm.

**Northwest Foundry & Furnace Co.,** Portland, Ore., was the victim of a three-alarm fire at 3:40 a.m., January 22. Damage was estimated at $200,000. The company lost chiefly its production facilities, as finished items and components were not affected. Northwest expects to get "some" production going this month, according to W. R. Pindell, vice-president and general manager.

**Wellman Bronze & Aluminum Co.** has opened new offices for its executive, sales, accounting, and purchasing departments at 12800 Shaker Blvd., Cleveland, Ohio.

**Unitcast Corp.,** Toledo, Ohio, announces the following changes in officers: W. E. Wine from chairman of the board to honorary chairman of the board; Ralph F. Tillman from vice-chairman of the board to chairman of the board; Lambert J. Tillman from president to vice-chairman of the board; and Joseph L. Tillman from executive vice-president to president. In addition, Lambert J. Tillman was advanced to chairman of the board of Canadian Unitcast-Steel, Ltd., Sherbrooke, Quebec, Canada.

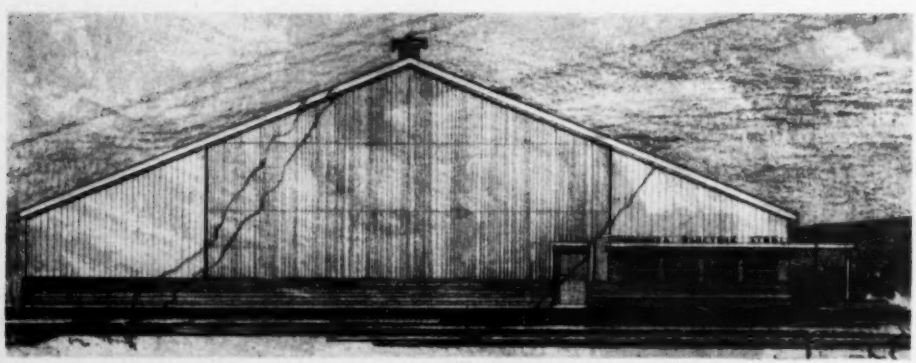
**American Brake Shoe Co., American Manganese Steel Div.,** New York, has shifted its personnel. W. Frank Kelly was appointed assistant vice-president, John E. Holtman was appointed general superintendent of foundries, Bruno S. Weselis was moved up to works manager of the Chicago Heights plant, and Paul H. Bohlen has succeeded Mr. Weselis as assistant works manager.

**Caterpillar Tractor Corp.,** Peoria, Ill., plans to expand its Joliet, Ill., plant. It will also open a plant in York, Pa.

**American Steel Foundries,** Chicago, is building a chemical laboratory near the World War II Armor plant it is again operating.

**Fairchild Engine & Airplane Corp., Aircraft Div.,** Hagerstown, Md., has installed a combination semi-automatic radiographic machine and automatic film developer to inspect its castings. Equipment produces a film a minute, and handles trays of castings at a time. It even takes care of temperature control, replenishing of solutions, and circulation. In-work time from receiving to stores has been reduced by 20 per cent.

**General Steel Castings Corp.,** Eddystone, Pa., has had 24 electric-driven furnace cars built by Easton Car & Construction Co., Easton, Pa., for its new heat treating plant at Eddystone. Plant was designed by Selas Corp. of America



**This sketch of a proposed foundry by Thomas J. Imbs, Buffalo architect, illustrates a design which won first prize in the industrial division of the New York State Association of Architects' convention contest last October. The building is 90 by 140 ft, of steel frame and corrugated asbestos construction. A large area of corrugated glass in the south end admits ample light. Location is on the bank of the Niagara River, a few blocks from the present plant of the Tonawanda Electric Steel Casting Corp., North Tonawanda, N.Y. Construction was delayed awaiting the final plans for a new highway cutting through the property, according to J. H. Sander, president of the company, but the new building is expected to be occupied some time in July.**

and is being built by the U. S. Army Corps of Engineers. The cars will serve a battery of furnaces in a completely automatic system developed for continuous heat treating of cast armor steel.

**American Radiator & Standard Sanitary Corp.'s** Louisville plant was toured recently by 125 convention delegates of the Kentucky State Assn. of Master Plumbers.

**Peerless Machine Co.,** Racine, Wis., announces the election of C. O. Wanvig Jr. to the office of president. He succeeds the late J. R. McDonald. Five directors were also chosen at the regular stockholders' meeting. These include C. O. Wanvig, Sr., formerly vice-president and treasurer who becomes chairman of the board; C. O. Wanvig Jr.; William M. Wanvig; Frank T. Frey; and J. P. Hanson. Other company officials announced include Frank T. Frey, vice-president; O. M. Jensen, vice-president in charge of engineering; Frank T. Wruk, vice-president in charge of sales; and J. P. Hanson, secretary and treasurer.

**Caterpillar Tractor Co.,** Peoria, Ill., recently promoted four men. W. C. Birdzell, formerly a purchasing agent, will take charge of purchasing at a new plant near York, Pa. Ridley Orton is new purchasing agent for the Peoria plant. W. G. Schuller becomes assistant general purchasing agent for the company, assisting in departmental direction. Replacing him as Joliet purchasing agent will be C. W. Russell.

**American Brake Shoe Co.,** New York, has established a new service award program. Already in effect, this program provides for distribution of company stock, watches, and buttons to employees reaching 25 and 40 years' service. First awards went to 862 employees in the 25-year class and 101 veterans of 40 years' service.

**Metropolitan Brass Founders' Assn., Inc.,** New York, held its annual meeting in January and elected the following officers: president, Eugene Fiamma, World Brass Fdry. Co. Inc., New York; vice-president, Jack Friedman, Bronx Brass Fdry., Inc., New York; secretary-treasurer, Raymond E. Bietry, B & S Bronze Fdry., Inc., New York.

**Lava Crucible Co.,** Pittsburgh, has changed its name to Lava Crucible-Refractories Company.

**Magnaflux Corp.,** Chicago, announces that its inspection service has been greatly expanded. Two types of inspection are available—laboratory service for small parts, and field service for large objects. Laboratories have been expanded from 5 to 11, located in Chicago; New York; Hartford, Conn.; Cleveland; Detroit; Wichita, Kansas; Dallas, Houston, and Odessa, Texas; Los Angeles, and Oakland, Calif.


WILKINSON
PUMP AND
METER SYSTEM

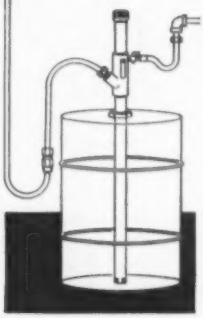
*Pumps core oil directly from drum to sand mixer*

FOR CONSERVATION OF MATERIAL
FOR ACCURACY OF MEASUREMENT
FOR OPERATOR CONVENIENCE
FOR BETTER HOUSEKEEPING
FOR ADDED SAFETY
NO AIR ENTERS DRUM OR MATERIAL

FOR SAVINGS IN TIME AND LABOR

See this equipment in The S. Obermayer Co. BOOTH — 1522

No guess work . . . no spillage. Shut-off valve simultaneously controls oil flow and pump operation. Accurate metering device measures whatever quantities of oil may be desired.



*Send for complete information.*

WILKINSON
*Equipment & Supply Corp.*
6938 South Wentworth Ave.
Chicago 21, Illinois

IDEAS FOR MODERNIZATION

MOULDS CLEANED MORE THOROUGHLY AND SAFELY WITH HOFFMAN HEAVY-DUTY VACUUM CLEANING

Removes sand and shot quickly from even the most intricate castings — without danger of compressed air blowing. Fewer cut-eye cases. A cleaner plant — fewer rejects — higher worker morale. Cleans overhead areas as well as floors, gangways, pattern shops fast, thoroughly. Heavy-duty portables and stationary systems to fit every plant requirement. Write for literature and FREE Survey.

AIR APPLIANCE DIVISION
U.S. HOFFMAN MACHINERY CORPORATION
99 FOURTH AVENUE, NEW YORK 3, N.Y.
CANADIAN PLANT CANADIAN HOFFMAN MACHINERY CO. LTD. NEWMARKET ONT.

# Your own core oil?

PERHAPS you've had the problem of finding your own core oil—a core oil that will perform correctly under especially critical conditions. If you have, you probably know what a tough job it is to find a standard oil for the job.

Now, you don't have to put up with any product that won't fill the bill. Just call on Pelron to work with you to develop an oil that will produce cores of the correct hardness, baked strength and shakeout qualities for your job. Pelron technicians have solved many such problems for foundries who can't afford to have complex castings rejected just because they have no answer to the core problem.

When your own core oil is developed by Pelron, all you do is purchase the oil as you need it. There is no extra charge for development costs. Our interest is only to provide you with an oil that will meet your needs. Call us in today for the solution to your core oil problem.

*Get it from* **PELRON**

- Less Baking Time
- Lower Baking Temperatures
- Easier Shakeout
- High Baked Strength
- Increased Foundry Production

**PELRON** CORPORATION

Industrial Oils and Chemicals
For Better Production at Lower Cost

7740 W. 47th Street • Lyons, Illinois


## *chapter news*

*continued from page 166*

Falls, N. J.; Gray Iron, Harry H. Kessler, Sorbo-Mat Process Engineers, St. Louis, Mo.; Steel, Rod O'Conner, Cooper Alloy Foundry Co., Hillside, N. J.; Brass and Bronze, R. A. Colton, American Smelting & Refining Co., Barber, N. J. This session brought forth some interesting questions and stimulating discussion.

## Western New York

MARVE E. TAUBLIEB
*Frederic B. Stevens, Inc.*

Featured speaker at the February meeting was Harry H. Kessler, Sorbo-Mat Process Engineers, St. Louis, Mo. His subject was *"Gating and Risering"*.

He stated that there are several correct methods, emphasized that solid castings is the important factor, and presented a formula that has proven effective 95 per cent of the time. Gates, he said, should be as small as possible, consistent with short pouring time.

Mr. Kessler stated that chills should be used only as a last resort; if this fails, return the casting to the engineering department for redesign, he said.

National Director Martin J. O'Brien Jr., Symington-Gould Corp., Depew, was technical chairman of this meeting.

## Tri-State

J. G. WINGET
*Reda Pump Co.*

After a steak dinner at the Woodland Wing Country Club, Tulsa, the February 15 meeting settled down to an excellent film, *"Foundry Mechanization"*. Mr. C. V. Nass of Beardsley & Piper Div., Pettibone Mulliken Corp.,

**J. P. McClendon (left) Stockham Valves & Fittings, Birmingham, Ala., veteran Birmingham District chapter reporter, is ordinarily in back of the camera taking somebody else's picture. He's pictured here with Jack Bolt, University of Alabama Student Chapter chairman, at a meeting preceding the Southeastern Regional Foundry Conference.**

**Walter J. Yahn (left), chairman of the new Pennsylvania State College Student Chapter, talks things over with A.F.S. National Director E. C. Troy, foundry consultant, Palmyra, N. J., at the chapter's January meeting. Featured speaker was M. W. Borgeson, Sorbo-Mat Process Engineers, St. Louis, who discussed "Cupola Operation."**

Chicago, narrated the film. He stated that proper mechanization of any foundry is peculiar to that foundry, and that the problem must be handled on an individual basis.

At the business session following, plans were announced for a regional conference to be held this year in conjunction with the Texas Chapter in Dallas.

## Twin City

J. D. JOHNSON
*Archer-Daniels-Midland Co.*

Over 100 members and guests assembled for the February 12 meeting, held at the Covered Wagon, Minneapolis. Principal speaker was Richard Herold, Foundry Products Dept., Chemical Div., Borden Co., New York. His topic was "*Shell Molding*".

He stated that at present there are some 25 foundries making castings from shell molds, and encouraged foundrymen to take the necessary steps—at a cost of $400 to $1000—to evaluate shell molding. After the talk came an active discussion.

Two other technical sessions were also held, one on "*Gating and Risering*" led by Nathan Levinsohn, Minneapolis Moline Co., and the other on "*Physical and Chemical Properties of Cast Metals*" led by Fred DeMoney of the University of Minnesota Testing Laboratory and Albert C. Holler of Twin City Testing and Engineering Laboratory, St. Paul.

## Central New York

RALPH J. DENTON
*R. J. Denton Co.*

The March 14 meeting designated "Non-ferrous Night" was held at the Roof Garden, Hotel Onondaga.

Walter Sicha, Cleveland Research Div., Aluminum Co. of America, talked

I DETECT HE BONDS
HIS MOLDS WITH---
***CONSISTENTLY HIGH QUALITY***

# NATIONAL BENTONITE

**It doesn't take a detective to find out that National Bentonite helps foundrymen make better molds. A great many expert foundrymen have used National Bentonite regularly for years to insure molds with high strength both green and hot, with minimum moisture content. This last point is important, since it means much less chance of gas holes and blows. Molds made with National Bentonite also yield castings with finer finish—and that's often important, too.**

**BAROID**
**SALES DIVISION**
**NATIONAL LEAD COMPANY**

**BENTONITE SALES OFFICE**
**RAILWAY EXCHANGE BLDG.**
**CHICAGO 4 • ILLINOIS**

***These approved* DISTRIBUTORS *will give you quick service.***

American Cyanamid Co.
New York, New York
American Steel & Supply Co.
332 S. Michigan Ave.
Chicago 4, Illinois
The Asbury Graphite Mills, Inc.
Asbury, New Jersey
Baroda & Page, Inc.
Kansas City, Missouri (main office)
Also—(Branches)
Tulsa, Okla.
Oklahoma City, Okla.
Wichita, Kansas
Dallas, Texas
Houston, Texas
New Orleans, La.
G. W. Bryant Core Sands, Inc.
McConnellsville, New York
Lloyd H. Canfield Foundry Supplies
1721 Minnesota Ave.,
Kansas City, Kas.
Combined Supply and Equipment Company
215 Chandler St.,
Buffalo 7, N. Y.
The Foundries Materials Co.
Coldwater, Mich. Also — (Branch) Detroit, Mich.
Foundry Service Company
North Birmingham, Alabama
James R. Hewitt
Houston, Texas
Interstate Supply & Equipment Co.
647 West Virginia St.,
Milwaukee 4, Wis.
Independent Foundry Supply Co.
6463 East Canning St.
Los Angeles, California
Industrial Supply Co.
San Francisco, California
Klein-Farris Co., Inc.
Boston, Massachusetts
New York - Hartford, Conn.
LaGrand Industrial Supply Co
Portland, Oregon
La Salle Builders Supply, Ltd.
Montreal, Quebec, Canada
Marthens Company
Moline, Illinois
Carl F. Miller & Co.
Seattle, Washington
Pennsylvania Foundry Supply & Sand Co.
Philadelphia, Pennsylvania
Refractory Products Co.
Evanston, Illinois
Robbins & Bohr
Chattanooga, Tennessee
Smith-Sharpe Company
Minneapolis, Minnesota
Steelman Sales Co.
Chicago, Illinois
Stoller Chemical Co.
227 W. Exchange Ave.
Akron, Ohio
Wahenn Abrasive Co.
Chicago, Illinois
Mr. Walter A. Zeis
Webster Groves, Missouri

*with* STARRBIDE

**CARBON-BONDED SLAG HOLE BLOCKS**

**Longer Cupola Runs** because Starrbide Carbon-bonded slag hole blocks stay in use longer than ordinary blocks.

**Reduced Erosion** from heat and slag flow to an amazing minimum.

**Improved Flow Control** because runs are longer, more easily scheduled.

**Higher Thermal Conductivity** rapidly dissipates heat.

**Greater Production** because shutdowns are reduced.

**AMERICAN REFRACTORIES & CRUCIBLE CORP.** NORTH HAVEN CONNECTICUT

ALSO MAKERS OF FAMOUS STARRBIDE CARBON-BONDED CRUCIBLES, GRAPHITE CRUCIBLES AND SUPER REFRACTORIES.


on "*Aluminum Foundry Practice*". In addition to giving the many factors which make good castings, he showed slides to further illustrate what is being done and what can be done with different types of non-ferrous metals.

National Director Lloyd D. Wright, gave a brief résumé of plans for the A.F.S. National Headquarters' new home and for the coming convention in Atlantic City, N. J., May 1-7.

The February 8 meeting took place in the ballroom of the Hotel Onondaga, Syracuse. Chairman William D. Dunn, Oberdorfer Foundries, Syracuse, presided over the meeting, which was designated "Old Timers' Night".

Program proved to be a most interesting and enlightening one on sand. A film, "*Sand*," was presented by Whitehead Bros. Co., N. Y., which covered production, grading, and general types. In addition, Harry C. Marley, Syracuse Surplus Co., who was recently a member of a four-man commission appointed by the U. S. government to survey the scrap steel situation in the Far East and the steel situation in Japan, commented on our position in Korea, on Japanese production facilities, and emphasized the serious problem facing this country.

## Missouri School of Mines

JACK H. THOMPSON
*MSM*

The March meeting featured a talk by National Director T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa. A graduate of Missouri School of Mines, he was introduced by a former professor of his, H. R. Hanley.

Mr. Eagan talked on "*Practical Aspects of Nodular Iron*", covering practical applications, and physical and chemical properties. Following the talk there was an active question session. The meeting ended with an informal social hour.

## Chicago

DEAN VAN ORDER
*Burnside Steel Foundry*

The March meeting held at the Chicago Bar Association was a round table discussion with separate gray iron and malleable, and steel group meetings.

The combined gray iron and malleable session was under the chairmanship of Leroy E. Taylor, Goebig Mineral Supply Co., Chicago. The topic, "*Sand*" was ably discussed by Mr. Taylor and his panel of experts consisting of Karl J. Jacobsen, Griffin Wheel Co., Chicago; Adrian C. den Breejen, Nichol Straight Foundry Co., Chicago; Leo F. Dennie, Black Products Co., Chicago; Cecil F. Semrau, Illinois Malleable Iron Co., Chicago; and, Edwin J. Jory, National Malleable and Steel Castings Co., Cicero. A very lively discussion prevailed over the many factors involved in mixing sands for various weights and designs of castings.

The steel session under the leader-

ship of Robert L. Heath, Climax Molybdenum Co., New York. Heard Mitchell Silverstein, Specialloy, Inc., Chicago, speak on *"The Basic Aspects of Ferro Alloy Conservation"*. Mr. Silverstein pointed out some of the modern trends in alloy conservation by metal substitution. Many foundrymen can apply some of these methods in a small way within their own plants.

## Canton

WILLIAM T. COLE
*Canton Malleable Iron Co.*

Elks' Club in Alliance, Ohio, was the scene of the meeting held March 6. Featured speaker was Frank G. Steinebach, Penton Publishing Co., Cleveland, who discussed *"The Foundry in the Mobilization Program"*. The meeting was also distinguished by the presence of three A.F.S. national officers, President Walter L. Seelbach, Director V. J. Sedlon, and Secretary-Treasurer William W. Maloney. About 100 members and guests attended.

C. B. Williams, Massillon Steel Castings Co., presided, and A. O. Prentice, Stark Foundry Co., the program chairman introduced the speakers.

In addition to the regular meeting, a luncheon was held on the same day at the Canton Club in Canton to introduce the executives of the member companies to the national officers and the main speaker. This brief and informal luncheon was attended by 34 persons.

## Quad City

ERIC WELANDER
*John Deere Malleable Wks.*

Ralph L. Lee of the Public Relations Department, General Motors Corp., Detroit, was the speaker at the "Boss' Night" program attended by approximately 135 foundrymen and guests at the Fort Armstrong Hotel in Rock Island, Ill., on March 17.

Mr. Lee spoke on *"Science of Humanics"*. He pointed out the necessity of dealing with the facts in our relations with employees. He explained that everyone is different and that most people cannot change as much as we think. He also emphasized that no one is the same all of the time, and must be dealt with accordingly.

Alex D. Matheson, French & Hecht Div., Kelsey-Hayes Corporation, Davenport, Iowa, served as technical chairman. Entertainment was furnished by Johnson's Melody Men, a group of singers from a local foundry.

## Oregon

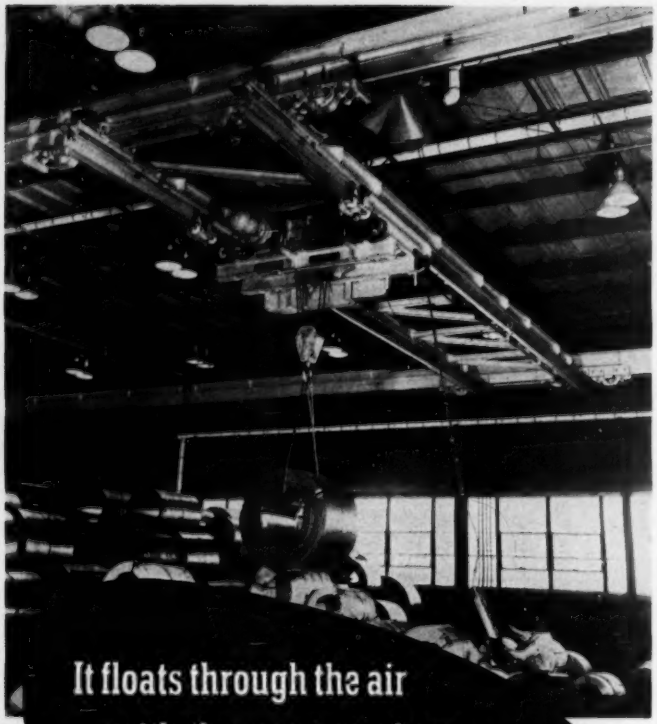
NORMAN E. HALL
*Electric Steel Foundry Co.*

Featured at the January meeting held at the Heathman Hotel was William Romanoff, H. Kramer & Co., Chicago, who addressed the group on non-ferrous metals. Reviewing the history of some of the non-ferrous alloys, Mr. Romanoff pointed out that shortages of critical materials during the last war led to the development of some of the present-day alloys which are superior to the ones they replaced. Using this to demonstrate his point, the speaker urged the foundries to use substitute alloys when necessary but under no circumstances to sacrifice the quality and safety of their castings through such substitution.

James Smith, Metal Castings Div. of Oregon State College and faculty adviser of the student chapter, expressed the appreciation of the student chapter to local foundries and the Oregon Chapter for their aid to the Educational Committee in carrying out their program. The Educational Committee established this year by the Oregon Chapter to aid Oregon State College Student Chapter is receiving wonderful cooperation from local foundries in carrying out its program. The drive for additional equipment for use by the students in the college shops resulted in generous support by Portland foundries and some of the equipment donated has already been reconditioned and placed in use.

Through the activities of the com-

THESE CUPOLA BLOCKS AND LINERS
ARE STRONGER AND LAST MUCH LONGER!
CLEVELAND QUARRIES CQ ABRASIVES
Large and small foundries are enjoying many outstanding advantages from the use of Buckeye Silica Firestone. Especially impressive are its low first cost, ease of installation, high resistance to heat and abrasion, and its important assistance in maintaining scientific cupola control. Important results are lower operating costs, and maximum uniformity in the quality of the metal.
For long, continuous heats, dimension blocks of 6" and more in thickness are used for lining and patching . . . they offer any desired thickness of lining with a minimum of cutting.
Standard machine-cut, sawed two sides cupola blocks of Buckeye Silica Firestone can be supplied in any required thickness.
Whatever your cupola problem, there is a Buckeye Silica Firestone solution for it . . . our service organization will gladly consult with you at no obligation.
THE CLEVELAND QUARRIES COMPANY
1740 East Twelfth Street
CLEVELAND 14, OHIO
BUCKEYE SILICA FIRESTONE
It's Free...
● Send for your copy of Buckeye Silica Firestone Bulletin 15-B. It's free for the asking.
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE




*when handled by*

**AMERICAN MONORAIL CRANES**

One man easily unloads, stores and moves seven-ton coils of steel with this 10-ton American Mono-Rail Crane. These cranes furnish efficient operation where low headroom is a critical problem. Interlocking devices permit carrier to travel beyond craneways. Loads are moved over maximum area. Articulated trolleys assure perfect alignment of trucks for smooth crane travel. American MonoRail Cranes are ruggedly built to handle loads up to 10 tons at operating speeds of 500 feet per minute.

Let an American MonoRail engineer tell you about these fast-moving constant-service cranes.

Please write us.

**THE AMERICAN MONORAIL COMPANY**

**13122 ATHENS AVENUE • CLEVELAND 7, OHIO**

mittee, various plant tours have already been made. On January 12, Electric Steel Foundry Co. was host to a group of 15 from the college. William Halverson, Charles Coey and John Meece led small groups of four or five men each through the plant and carefully explained each phase of the company's operations.

A similar tour of the Rich Manufacturing plant was made on February 9. One plant visitation a month for the balance of the year is the goal of the student chapter according to the advice of Student Chapter Chairman Charles Utterback.

An interested member in the plant tours is Jayatissa Nihal deMel, a foreign exchange student attending Oregon State College under the sponsorship of the Institute of International Education of New York. DeMel, whose home is Colombo, Ceylon, is a sophomore in mechanical engineering and came to Oregon State in the fall of 1951.

Members of the Educational Committee of the Oregon Chapter are: Co-chairmen Neal Wilcox of Electric Steel Foundry Co., Portland, and F. A. Stephenson of Dependable Pattern Works, Portland, and members-at-large David E. Crabtree of Vancouver Iron & Steel, Vancouver, Wash., and Charles Coey and John Meece of Electric Steel Foundry Co., Portland.

Plans to date for the Northwest Regional Foundry Conference to be held in Portland on October 24 and 25 were discussed by Conference Chairman W. R. Pindell, Northwest Foundry & Furnace Wks., Portland. The selection of committees and their chairman were made at a recent board of directors meeting, and the following are already at work on the conference: vice-chairman, Wm. Halverson, Electric Steel Foundry Co., Portland; Sessions, James Dorigan, Electric Steel Foundry Co., Portland; Reception, Registration & Housing, George Vann, Northwest Foundry & Furnace Works, Portland; Finance, M. O. Woodall, Rich Mfg. Co., Portland; Banquet, James Brodigan, Columbia Steel Castings Co., Portland; Attendance, Promotion & Publicity, Norman Hall, Electric Steel Foundry Co., Portland; Luncheon, James Smith, Oregon State College; and Ladies Activities, Hugh H. Templeton, Balfour Guthrie & Co., Ltd., Portland. The entire conference and housing will be held in the Multnomah Hotel and the full program will be outlined in the near future.

## Central Indiana

PAUL V. FAULK
*Electric Steel Castings Co.*

March 3 was the date of the regular monthly meeting held at Athenaeum Turners, Indianapolis. Presiding was Carl Schopp, Link-Belt Co.

Program was put on by Fred Carl, William Hollar, and Arthur Anderson, all from Fabricast Div., General Motors Corp., Danville, Ill. They demonstrated the laboratory method of making shell

# "SO THAT'S WHERE THOSE LITTLE PIGS WENT!"

CHIEF KEOKUK: Sure enough, dear! Thousands of Electro-Silvery pigs were melted down to help make the iron and steel for those skyscrapers . . .

PRINCESS WENATCHEE: . . . and wasn't Electro-Silvery used in making the metal for this boat we're on, and for tanks and tractors and automobiles?

CHIEF KEOKUK: Right! It's hard to find *any* type of product made of iron or steel that *doesn't* use Electro-Silvery!

CHIEF KEOKUK JR: Gosh, Pop, what *is* Electro-Silvery?

CHIEF KEOKUK: Electro-Silvery, son, is a form of ferro-silicon that acts as a vital control element in the production of iron and steel . . .

PRINCESS WENATCHEE: . . . and the world's largest producer of this vital ingredient is the Keokuk Electro-Metals Company!

## KEOKUK

**ELECTRO-METALS COMPANY**

KEOKUK, IOWA

WENATCHEE DIVISION: WENATCHEE, WASHINGTON



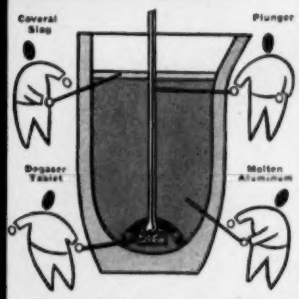
Keokuk Electro-Silvery is used by foundries and steel plants in the form of these three pigs, weighing 60 pounds . . . 30 pounds . . . and 12½ pounds.

**SALES AGENTS: MILLER AND COMPANY**

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
915 Olive St., St. Louis 1, Missouri

for better
ALUMINUM castings
at lower cost

® FOSECO
ALL-IN-ONE
TREATMENT




The easiest and most efficient method yet devised for degassing and grain refining all aluminum alloys.

- ★ *Reduces metal loss*
- ★ *Prevents oxidation*
- ★ *Removes dirt and slag*
- ★ *Metal-free dross*
- ★ *Eliminates gas holes*
- ★ *Refines grain size*
- ★ *Aids feeding*
- ★ *Increases fluidity*
- ★ *Increases physicals*

**EASY—EFFICIENT
ECONOMICAL—SAFE**

Melt aluminum under protecting layer of FOSECO COVERAL #11. Ten minutes before pouring, plunge a FOSECO DEGASER #190 tablet into the liquid metal. Skim the dross and the metal is ready to produce finest castings.

**FOSECO COVERALS — DEGASERS — GRAIN REFINERS** — Available for all aluminum alloys. Backed by nearly a quarter century of "know-how" and experience.

**MAKE YOUR OWN TEST!** Write today for samples and complete information. If you have a special problem, tell us about it—we will be glad to help you.

**FOUNDRY SERVICES, Inc.**
**280 Madison Ave., Dept. K**
**New York 16, N. Y.**

molds, and later conducted a panel discussion.

A.F.S. vice-president I. R. Wagner, then gave a short announcement of the foundry health conference at the University of Michigan, April 11 and 12, explaining how important this type of education is to the foundry today.

## Rochester

H. G. STELLWAGEN
*Hetzler Foundries, Inc.*

"Patternmakers' Night", March 4, was attended by 71 people, 35 of whom were patternmakers. George K. Dreher, Foundry Educational Foundation, spoke briefly and was followed by a movie, "*The A-D-M of Cores*" sponsored by Archer-Daniels-Midland Co., Cleveland. Andrew Coulter ran it.

Guy A. Pealer, Elmira Foundry, General Electric Co., Elmira, N. Y., was the principal speaker. He went thoroughly into the patternmaking and molding industry, discussing it from the 14th century to modern times. With illustrations he showed that the cheapest pattern is not always the lowest in actual cost. Patternmakers who are pattern engineers, he said, will show pattern buyers how to save money in the purchase of castings. He followed his lecture with another movie, "*World's Largest Work Shop*", which showed how General Electric produces patterns and castings.

## Birmingham District

J. P. McCLENDON
*Stockham Valves & Fittings*

January meeting drew one of the largest crowds of the year to hear E. E. Pollard, Alabama Pipe Co., Anniston, speak on "*Mechancial Cupola Operation.*"

Social hour and dinner were in charge of William Bach, John F. Drenning and Gene Whelchel, who supervised refreshments and a chicken dinner.

Chapter Chairman C. K. Donoho, American Cast Iron Pipe Co., introduced 17 visitors and new chapter member John Goodwyn of United States Graphite Co., transferred from the Tennessee Chapter.

Al Fruchle, U. S. Pipe & Foundry Co., announced plans for the chapter's Apprentice Contest. Twenty-one entries are already in, he said.

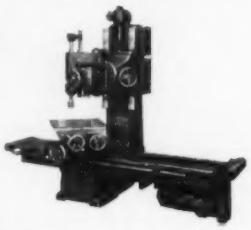
Complete program for the 20th Annual Southeastern Regional Foundry Conference was announced by Fred K. Brown, Adams, Rowe & Norman, Inc. vice-chairman.

## Toledo

GERALD GROTT
*Unitcast Corp.*

December meeting speaker was W. M. Ball, Jr., R. Lavin & Sons, Inc., Chicago, who discussed the basic position of foundries in relation to all industry. In his talk, Mr. Ball urged foundrymen

see this
"OLIVER"
Pattern Miller
at the Foundrymen's Convention
May 1-7, Atlantic City



The "Oliver" No. 103 Pattern Miller is unmatched for reducing the costs of pattern making. It handles an almost unlimited variety of difficult work efficiently. Even small jobs can be handled economically on this Miller. We shall also display a new Double Disk Sander, Spindle Sander and a Double Arbor Saw Bench. *Don't miss it!*

**OLIVER MACHINERY COMPANY**
**Grand Rapids 2, Mich.**

SCIENTIFIC
THE NAME TO REMEMBER FOR
GREATEST ACCURACY
SCIENTIFIC Pressure Cast MATCH PLATES
See our exhibit at
FOUNDRY SHOW
Booth No. 429-431
THE SCIENTIFIC CAST PRODUCTS CORP.
1390 East 40th Street
CLEVELAND 3, OHIO
2320 West Lake Street
CHICAGO 12, ILLINOIS

to concentrate on essentials of production, to be proud of the role in industry, and to mark the road for those who will follow.

Mr. Ball concluded by saying that the formula for foundry success is recognition and application of fundamentals with the aid and counsel of foundry technical societies.

*"Industrial Hygiene"* was the subject of the January meeting, with Gordon C. Harrold, industrial hygiene consultant, speaking on *"Control of Dust and Fumes in the Foundry."*

In discussing dust control, Mr. Harrold stated that only dust containing approximately 10 per cent or more free silica is active in promoting silicosis, and that normally only particles less than 1/2500 inches in diameter enter the lungs. Such small particles may be produced on the floor by walking, blasting and tumbling operations, and chipping and grinding of castings having adhered sand. The air hose, as used to blow dust from castings and work areas, was cited as being the worst offender in the foundry. Sand should be dampened for handling whenever possible and vacuum equipment used to remove dust from the floors, he added.

Where periodic X-rays are used as a control for silicosis, very careful consideration should be given to the selection of the physician who will examine the plates. The interpretation of the X-rays requires considerable skill, and only physicians having experience in the field of silicosis should be selected, according to Mr. Harrold.

Injurious fumes in ferrous foundries are rare, he added, though low-hydrogen welding rods employing fluorides in the flux may be injurious where the fluoride content is 10 to 15 per cent or greater. In non-ferrous foundries, lead is the worst offender and while many foundries provide adequate exhaust systems around the melting units, few pay any attention to the dross, which is equally dangerous. The use of power

**Chicago Chapter Chairman Walter W. Moore opens the chapter's March Round Table meeting.**

WITH ALSIMAG® CERAMICS

**HEAT RESISTANT WORK HOLDING DEVICES**

Precision made for your requirements. For holding work during brazing, soldering, electronic heating. Superior resistance to repeated hot-cold shock. Proper jigs, templates or other work holding devices can speed your operations many times over. Outline your problems and let us make recommendations.

**PRECISION CORES**

Can be furnished to exact dimensions for precision castings. Also economical and accurate method of forming many small area holes in castings.

**STRAINER OR CUT-OFF CORES**

Used in the riser to form a weak joint between riser and casting. Reduces cut-off time. In many cases riser can be knocked off instead of cut off. A great time and money saver. Can be made to your specifications. Cameron Cores, Patent No. 2313517, sold to Meehanite Licensees only.

**GATE TUBES**

Used in casting to convey molten metal into casting without contamination.

**TROUGHS**

For conveying molten metals. Custom made.

**STRAINER CORES**

These ceramic cores fit into gate of mold, strain the metal, regulate its flow. Cleaner castings, fewer rejects. Money saver. Made in two materials:

***ALSIMAG 564 (WHITE)** is less expensive, gives perfect performance with lower melting point metals such as cast iron. Adequate for some cast steel applications but test this material on steel applications before adopting it as standard. Has heat resistance above that of many materials recommended for use with cast steel but we are on the conservative side.*

***ALSIMAG 202 (TAN)** has highest heat resistance. For use with higher melting point metals such as steel.*

Dies in stock on many sizes and designs. Special designs reproduced economically. Samples from our files without charge. Special samples hand made at reasonable cost.

**AMERICAN LAVA CORPORATION**

CHATTANOOGA 5, TENNESSEE

*50TH YEAR OF CERAMIC LEADERSHIP*

OFFICES: Philadelphia • St. Louis • Cambridge, Massachusetts • Chicago
Los Angeles • Newark, N. J. • Dallas, Texas

tools to grind lead or lead bearing alloys used in pattern making is dangerous. The use of power tools to grind lead or lead bearing alloys used in pattern making is dangerous; but hand files and cutters are safe.

The speaker said there is little danger from carbon monoxide except in completely unventilated shops. Fumes from core baking, while acting as irritants, do not cause any permanent damage.

When asked to comment on future trends, Dr. Harrold cited allegations based on damage to property as well as humans, the growing tendency towards civil suits, regulations directed at odors as well as dust, increase in public demands for cleanliness.

## Washington

HAROLD R. WOLFER
*Puget Sound Naval Shipyard*

Lively interest in brass and bronze foundry problems was evident at the January meeting, when William Romanoff of H. Kramer & Co., Chicago, spoke on *"Brass & Bronze Foundry Problems."*

Good foundry practice is essential for the successful production of special alloy castings, in order to realize their greatest worth for special applications, Mr. Romanoff stated. The elements of foundry practice which determine the degree of success in this effort are gating, melting, pouring temperature, sand, equipment and metal. Faulty practice in the first three accounts for 90 per cent of losses in the brass and bronze foundry, he stated.

Mr. Romanoff described the steps in the manufacture of ingot from scrap metals to the finished ingot. Virgin metals never produce better physicals than properly made ingot, and besides, ingot is cheaper by about 0.03 cents a pound and requires less fuel to melt it, he said.

"Down grading," the use of elements obtainable at lower cost, is sound practice. It saves the customer money and conserves scarce metals, providing that the foundryman maintains quality control. A good casting of any of these substitutes is amply safe.

Mr. Romanoff said that to avoid hydrogen gas pockets in castings, it is mandatory to melt with an oxidizing flame. A practical way to test the flame is to hold a piece of cold zinc in the flame at a point close to where it emerges from the furnace, being sure that the zinc is in the flame and not in the atmosphere around it. The flame is oxidizing if at the end of five seconds in the flame the zinc remains unchanged in color. A brown color indicates a reducing flame and a black color a fully reducing flame.

Mr. Romanoff emphasized the importance of fast melting and immediate pouring for best results. However, he said, tests show that you can hold or soak the metal if you replace zinc and lead that are lost and pour at the right temperature providing that you melt with an oxidizing atmosphere.

The lowest temperatures at which a casting can be poured without misruns or internal shrinks is the best pouring temperature.

Feeding is sometimes improved by a pouring temperature slightly higher than the lowest temperature at which the job will run. Pouring temperatures must be determined by trial in the shop to suit different classes of castings.

The best shop test for correct pouring temperature is the fracture test. This test must be gauged to actual working conditions. An orange colored fracture indicates that the metal has been melted with a reducing flame. Castings poured too hot will show a discolored fracture.

He recommended pouring of test plugs 1½" in diam. to determine proper shrinkage before pouring castings of the drossy high tensile alloys. If unsoundness is apparent, add oxidizers or fluidizers to facilitate escape of dissolved reducing gases.

Hydrogen gas is commonly the culprit when pouring the copper lead alloys, he pointed out. To correct this condition, he recommended added sodium nitrate oxidizing flux or barium sulfate. He pointed out that tin in copper-lead alloys decreases solubility of the lead and that nickel, sulfur and manganese help to hold lead in solution.

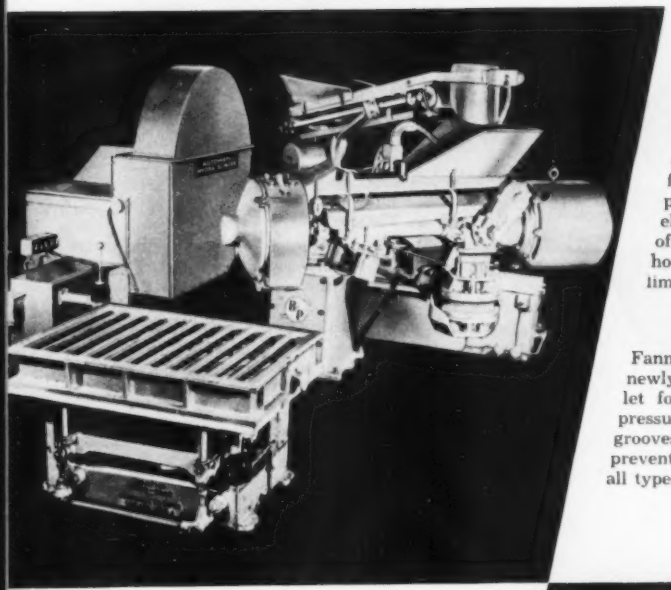
*continued on page 198*

WHY NOT A
MODERN
GRINDING ROOM?
HERE'S REAL PRODUCTION EFFICIENCY!
SAVE TIME • SAVE ON WHEELS
HANDLE THOSE ODD-SHAPED PIECES
TYPE HM
Here's the Standard Type HM Multi-speed Heavy Duty Snagging Grinder with its overhanging base (7½" extension from body of base). Overhanging base gives more room for grinding. You can reach those surfaces which are inaccessible for straight front base machines! Two operators can work conveniently!
Maximum wheel life. Single or multiple speeds. 3 H.P. to 7½ H.P. for 14" to 20" vitrified or high speed resinoid bond wheels. Multiple speed units have interlocking arrangement to prevent overspeeding of wheels.
GET THE FACTS ON THIS IDEAL GRINDER TODAY! WRITE FOR CATALOG 44.
ALSO:
GRINDERS
All kinds! Up to 100 H.P.
BUFFERS
Polishers up to 60 H.P.
ABRASIVE BELT MACHINERY
SPECIAL MACHINERY
TWIN WHEEL TOOL GRINDERS
THE STANDARD ELECTRICAL TOOL CO.
2544 RIVER ROAD
CINCINNATI 4, OHIO

**See us at Booths (1009-1011), International Foundry Congress, Atlantic City, N. J., May 1 through May 7**

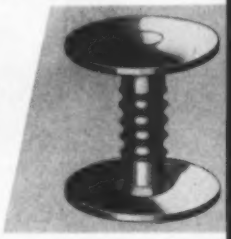
# exhibits preview

■ *In this preview of products to be shown at the week-long A.F.S. International Foundry Congress & Show are some of the newest tools of the metal castings industry. They are representative of the products of more than 250 of the world's outstanding foundry equipment manufacturers, suppliers and service organizations who will display their wares at the Foundry Show.*
■ *For more detailed information on products shown here, fill in the postcard on page 195.*



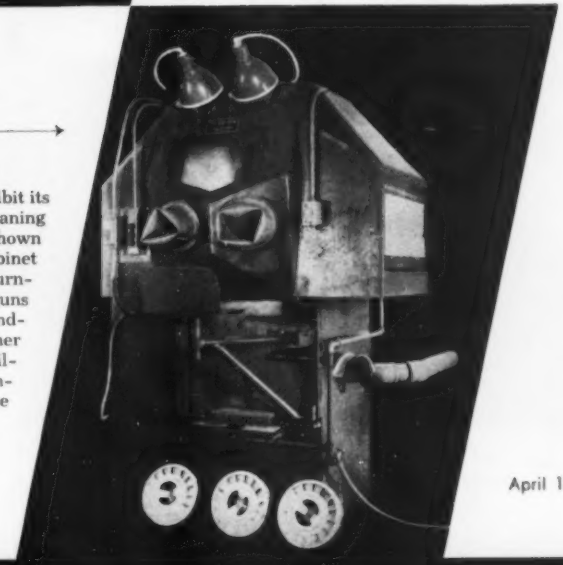
**1 Automatic Sandslinger**

One of the features of the Beardsley & Piper Div., Pettibone Mulliken Corp. exhibit, which will occupy the entire Auditorium stage, will be the automatic Hydra-Slinger for maximum production of repetitive jobs with perfect uniformity, mold after mold, and complete elimination of the human element. Unit rams over 20 cubic ft of sand per minute for 8, 16 or 24 hours a day. No human fatigue limits its production.



**2 Chaplet**

Fanner Mfg. Co. will show its newly designed Groovestem Chaplet for insuring against leaks in pressure castings. Wide radius grooves, plus countersunk shoulder, prevent gas pockets. Available in all types and sizes.



**3 Cleaning Cabinet**

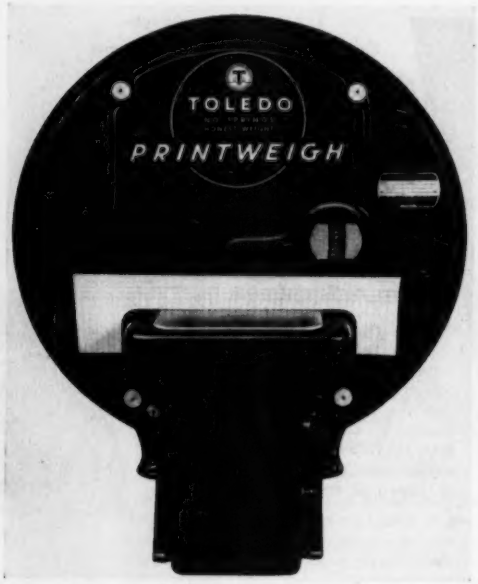
Hydro-Blast Corp. will exhibit its new cabinet unit for cleaning castings similar to those shown in foreground of photo. Cabinet comes equipped with either turntable or stationary table, and guns may be fixed or moveable, depending on type of work. Various other means of handling work are available, and core removal and finished blasting can usually be accomplished in one operation.

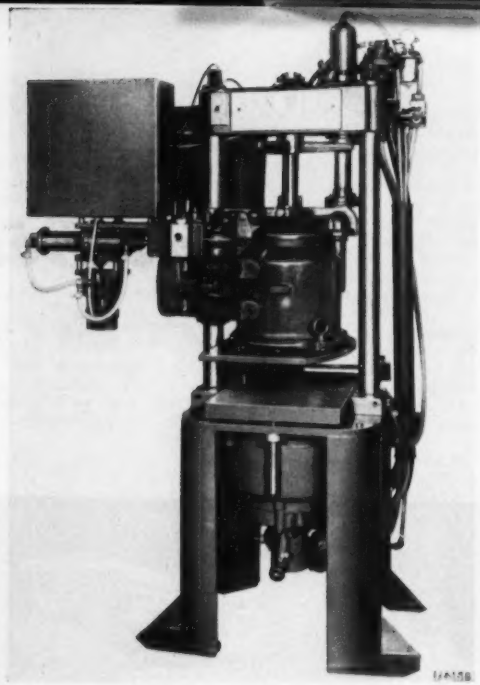
# exhibits preview

**Use postcard on P. 195 for more detailed information.**

**4 Coreblower**

Federal Foundry Supply Co.'s exhibit will feature the 1952 full-automatic San-Blo core blower, with automatic, electrically timed blowing cycle, automatic refilling of sand magazine, automatic drawing of core from cope half of core box, plus many new safety features. San-Blo blows any core mixture that can be hand rammed, produces cores any weight up to 40 lb. Standard sand magazine requires no changing.



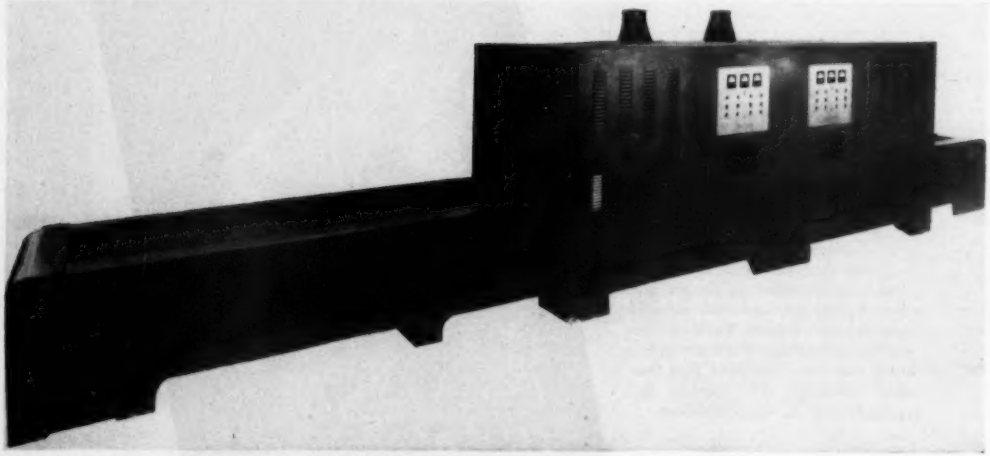



**5 Foundry Weight Controller**

Modern weight control for foundries will be the theme of Toledo Scale Co.'s Foundry Show exhibit. Featured will be the Toledo variable ratio Counting Scale, for automatically weighing and counting both small and large castings in minimum time. Booth will have demonstration of remote weight indication, where visitors being weighed can see their weight indicated on a Remote Dial in another part of the booth.

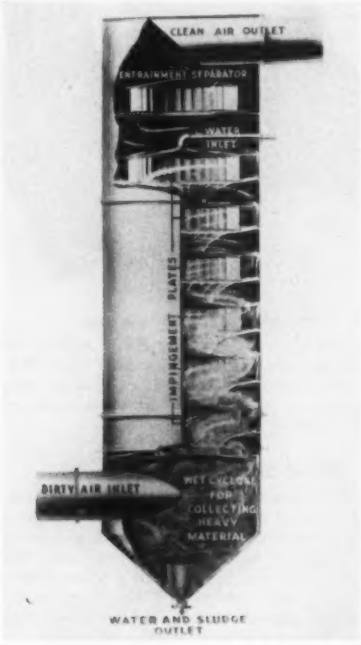
**6 Core Baking Tunnel**

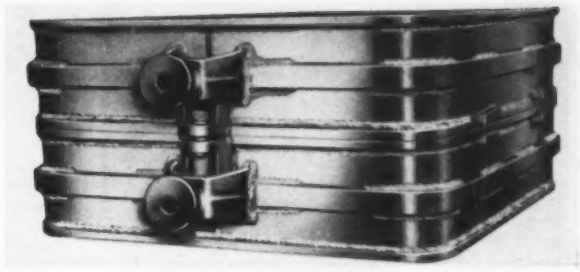
Induction Heating Corp.'s exhibit will center around its Model M 1800 A Thermonic Core Baking Tunnel, which will produce 2000 lb per hr of cores having 2-2½ per cent moisture, or 1500 lb per hr for 3-3½ per cent moisture. Bakes cores of varying sizes simultaneously, up to 12-in. high, 30-in. wide, of infinite length.



**7 Power Wheelbarrow**

Kwik-Mix Co.'s exhibit will headline the Moto-Bug, a power wheelbarrow that hauls 10 cu ft of bulk material, or 1500 lb, at a time. Full power forward or reverse. Climbs 20 degree ramps fully loaded. Can be turned in its own length. Gravity dump feature provides for instantaneous dumping, or for controlled dumping with snub line. Interchangeable attachments: flat bed, manual or hydraulic fork lifts.



**8 Fabricated Steel Flasks**

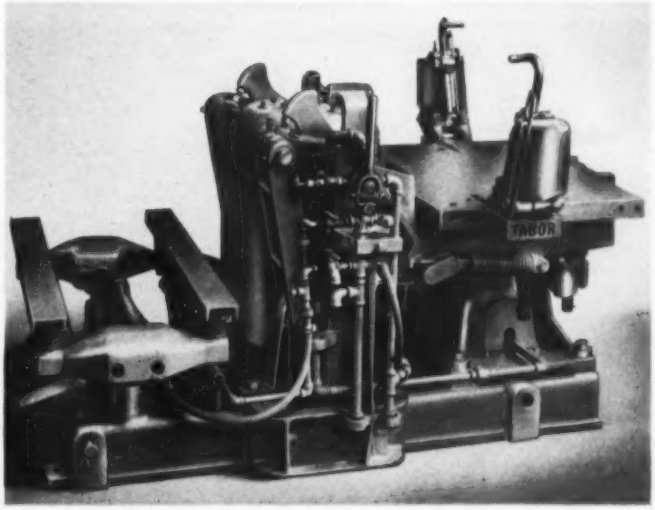
Representative styles of BS&B Fabricated Steel Flasks will be shown at Black, Sivalls and Bryson's exhibit at the 1952 A.F.S. International Foundry Congress & Show. Featured flasks shown will be the FP 14 lightweight and FP 22R heavy duty model (illustrated). FP 14 is designed to eliminate handling weight, yet has strength and rigidity to stand up under all conditions. BS&B Model FP 22R heavy duty flasks are designed for long service under tough conditions, with minimum of maintenance.

**9 Dust Collector**

Claude B. Schneible Co. will exhibit an operating Schneible Multi-Wash Dust Collector unit with transparent shell to illustrate principles of high-efficiency dust removal. Large installations and charts will outline methods and equipment for complete foundry dust control and ventilation.

**10 Rollover**

Tabor Mfg. Co. will display a 22-in. rollover incorporating many new features. Absolutely shock-free, machine has jarring end redesigned for better performance. Also new is a device for locking rollover plate and jarring head during jarring operation; as are quick changeover, double clamps, leveler.

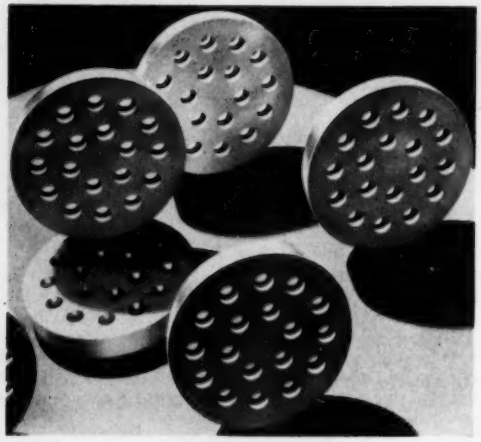


# exhibits preview

**Use postcard on P. 195 for more detailed information.**

### 11 Ceramic Strainer Cores

A new type of foundry ceramic strainer cores will be exhibited by American Clay Forming Co. at the Show. Core fits into mold gate and strains metal as it flows through strainer core holes, permitting even pouring and slag-free castings. Cores are strong and uniform and are not affected by heat shock of molten metal. Core holes remain round and firm during pouring operation, holding percentage of rejected castings to a minimum. Available in eight standard sizes.

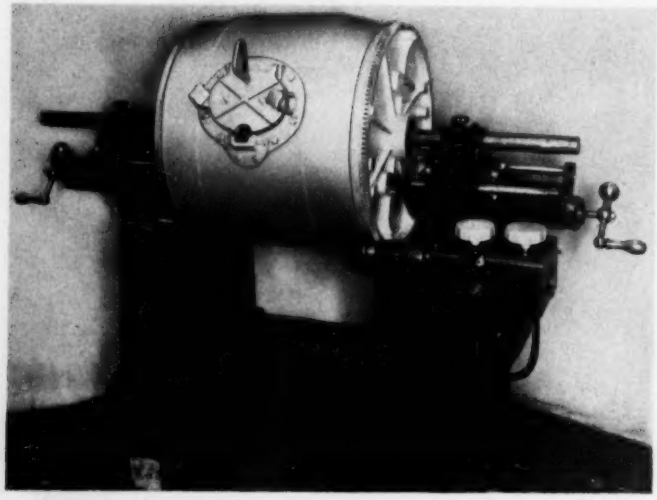


### 12 Automatic Core Draw Machine

Sutter Products Co.'s 1952 Foundry Show exhibit will have one of its power, rollover Automatic Core Draw Machines in actual operation to demonstrate its speed and ease of operation. Available in four sizes. Features: 6-second cycle, right or left hand operation.

### 13 Closed-Circuit Conveyor Display

Hewitt-Robins, Inc., will demonstrate five of its conveyor units in a closed circuit display wherein material passes from one machine to another as in a foundry. Belt conveyor feeds to belt and bucket elevator, then to an SSC unit, to a Vibra-Veyor, then a Vibra-Feeder and back onto the belt conveyor. This gives visitors an opportunity to visualize how machinery, available separately, will function in their plants.



### 14 Electric Furnace

A 60-lb GMS Type electric furnace will produce melts of alloy at Detroit Electric Furnace Div., Kuhlman Electric Co.'s booth. Alloys will then be used by the Borden Co. in its shell molding exhibit. Also on display will be typical larger furnaces and the new PT (Pot Tilting) 15-lb electric furnace.

### 15 Industrial Vacuum Cleaner

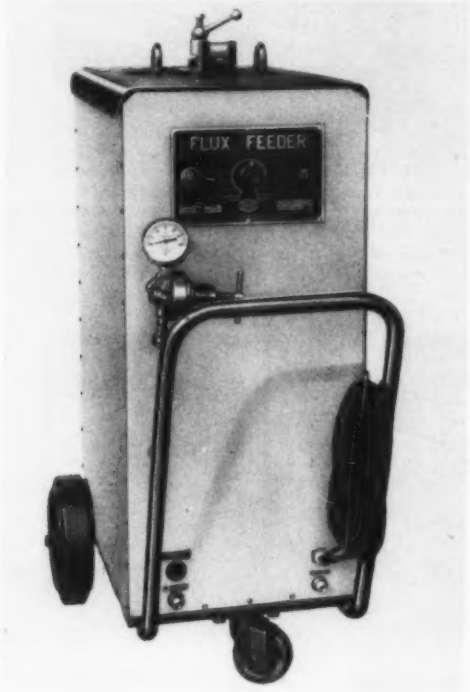
Spencer Turbine Co.'s 1952 Foundry Show exhibit will include a heavy-duty industrial vacuum cleaner especially designed to remove accumulated dust from overhead beams and walls. Extra large dirt container permits long cleaning periods without emptying can.

**16 Quiet Vibrator** ➡

Cleveland Vibrator Co. will show a new type of quiet vibrator (indicated by arrows in illustration at right) developed for the foundry industry. Reciprocating action of chrome-plated piston develops vibrating action without noise. Vibrator speed and intensity can be varied at will. Arching, sticking and bridging are completely eliminated. Available in five sizes.

**17 Liquid Diffusion Dust Control**

Johnson-March Corp.'s booth will exhibit several liquid diffusion compounds for controlling dust in foundries by wetting down floors and walks, sand conditioning operations, shakeouts, mulling operations and cleaning room operations. Wide range of compounds can be used with water, oil or other liquids.



⬅ **18 Stainless Steel Cutting**

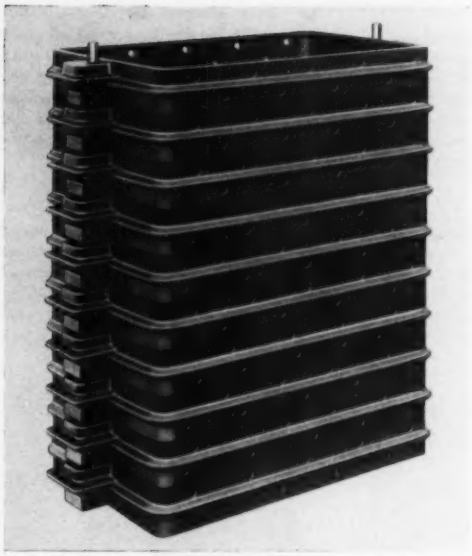
Air Reduction Sales Co. Division of Air Reduction Co. booth will feature new equipment for flux injection cutting of stainless steels. Vibratory feeding of cutting flux into air stream assures uniform feeding and accurate control even at very low flows. New flux feeder (illustrated) and auxiliary equipment can be used with hand and machine cutting torches.

⬇ **19 Shell Molding Release Agent**

General Electric Co.'s Chemical Division, exhibiting for the first time at the 1952 A.F.S. International Foundry Congress & Show, will feature a dry powdered resin and silicon release agent and a new phenolic resin core binder for shell molding. Technical experts will be on hand to explain the benefits of shell molding. Illustrated below are (left) a core bonded by a phenolic core binder, (center) bottled release agent, and (right) a shell that shows the benefits derived from using a phenolic shell resin together with a silicone release agent.

# exhibits preview

**Use postcard on P. 195 for more detailed information.**



**20 Stock Molding Technique**

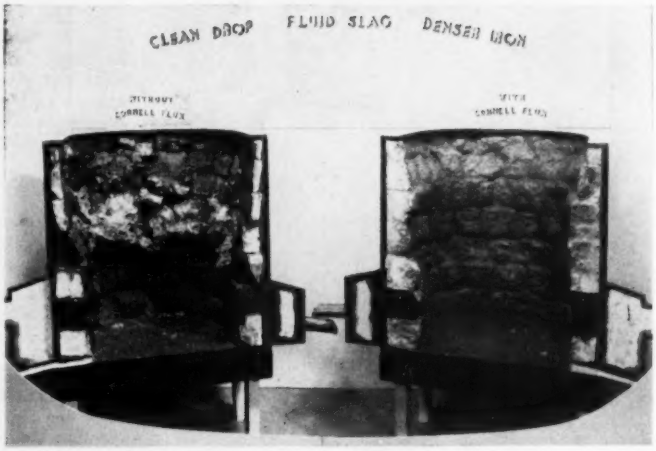
Sterling Wheelbarrow Co. will feature stack molding techniques and equipment in its exhibit. Sterling steel flasks are particularly well adapted to this technique because of ability to withstand tremendous pressures and reinforced ribs that prevent distortion.

**21 Foundry Oils and Compounds**

Delta Oil Products Co. exhibit will feature actual cores and castings made with Delta laboratory-developed and controlled core and mold washers, Permi-Bond, Partex, Sand Conditioning Oil, Dri-Bond, Bondite, and other specialized foundry products.

**22 Metal Cleanser**

Cleveland Flux Co. booth will feature Famous Cornell Cupola Flux, a metal cleanser in scored brick form used for more than 3 years in foundries all over the country. Section views (illustrated) will show a cupola interior with and without the use of Famous Cornell Flux.




**23 Gas Information Center**

American Gas Association will have an Information Center booth where foundrymen may visit with industrial gas engineers to discuss problems regarding use of gas for various foundry heating operations. AGA's Blue Flame Information Center will be glad to answer all questions on how to employ gas as a foundry fuel in the most efficient manner.

**24 Electronic Core Baking**

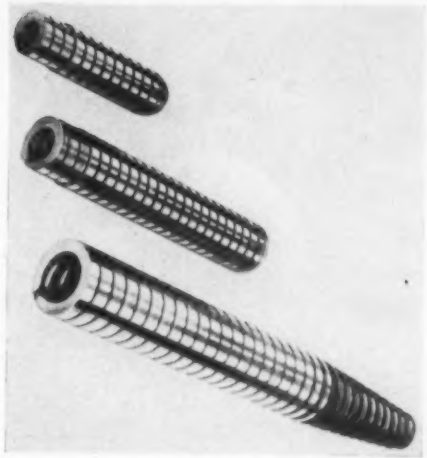
Thermex electronic core baking equipment will be featured at Girdler Corp.'s exhibit. Claimed to bring about substantial economies in labor, floor space, sand and binders, rejects, utilities and maintenance. Switchover to Thermex in one large plant is reported to have resulted in savings of 27.8 per cent in cost of producing finished cores—an annual saving to the foundry of $28,970.

**25 Payloader**

Frank G. Hough Co. will display four models of the Payloader, a tractor shovel built to handle bulk materials indoors or outdoors. Design features on all four models include multiple reverse speeds; full hydraulic bucket control; automatic bucket tip-back to prevent spillage; operator location for fullest visibility; and large tires for maximum traction. Model HA (illustrated) has 12 cu ft bucket, capacity of 1000 lb: Model HE has ½ cu yd bucket, 2000 lb capacity; HF has ¾ cu yd bucket, capacity 4000 lb; and HY 1¼ cu yd bucket, with 5000 lb capacity.

**26 Non-Binding Flask Pin**

Martin Engineering Co. will show a new non-binding flask pin that eliminates necessity for excessive tolerances allowed for ordinary flask pins. Pin will not seize or bind when cope is lifted from drag, and less skill is required to close and draw the mold. This flexible locating pin was tested during three year's continuous operation in three different foundries, resulted in a production speed-up of 100 per cent and in pin savings of 300 per cent.



**27 Core Oil**

Penola Oil Co.'s Foundry Show exhibit will center around advantages and applications of Penolyn Core Oil. Advantages claimed are: (1) no obnoxious odor, (2) no seepage, (3) no crusting of green mix, (4) clean working, (5) wide temperature baking range, (6) polymerized formulation, (7) minimum gas, and (8) ample collapsibility. Penola engineers will be on hand at the booth to answer questions on core oil problems.

**28 Foundry Sands**

Zanesville Sand Co.'s exhibit at the 1952 International Foundry Congress & Show will be combined with that of the Industrial Minerals Co. in a joint showing of various grades of molding, core and blast sands.

**29 Refractories**

Complete line of foundry refractories will be displayed at Harbison-Walker Refractories Co.'s booth. Included will be blocks, monolithic patching and ramming materials, and fireclay brick for cupolas; brick, patch, ganister, clays and mortars for ladles; refractories for electric, malleable and other furnaces; and mold refractories.

# exhibits preview

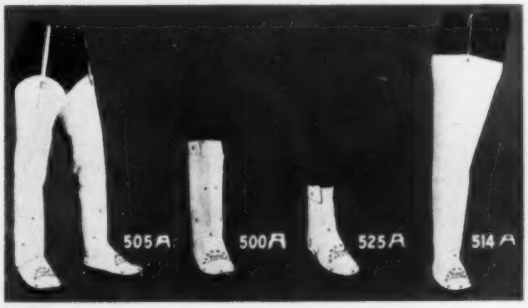
Use postcard on P. 195 for more detailed information.

**30 Carbon-Bonded Crucibles**

Headliners at Vesuvius Crucible Co.'s Foundry Show booth will be a complete new line of carbon-bonded crucibles, made according to accepted standard dimensions and requiring no changes in tongs or shanks.

**31 Core and Mold Washes**

From far off Ceylon, where it is hand-sorted by natives (see photograph at left) comes the fine plumbago used in Asbury Graphite Mills' Diamond Blacking for producing a smooth, clean casting surface. Asbury experts will be on hand throughout the Show to explain advantages of graphite and lead compounds.



**32 Safety Leggings**

Safety Clothing & Equipment Co. will show a complete line of new Aluminized Heat Reflecting Gardwell Leggings which reflect more than 90 per cent of all radiant energy, resisting temperatures as high as 3000 F and protecting personnel against heat and metal splash. Heat inside garment remains at body temperature, affording cool, comfortable working conditions.

**33 Alloys**

Niagara Falls Smelting & Refining Division, Continental Copper and Steel Industries, Inc., will display samples of special foundry alloys and complete literature outlining their application to obtain definite properties.

**34 Precision Casting Furnace**

Ajax Electrothermic Corp.'s exhibit will feature a new roll-over furnace developed for high-speed production of precision castings. This mechanically operated furnace transfers molten metal from furnace to mold in any preset cycle, usually only a few seconds. At end of melting period (12 min for 5 lb of alloy steel) pre-heated mold or investment is clamped directly to top of crucible and furnace rotates to pouring position. Metal fills mold at most desirable pouring rate. Temperature and analysis can be closely controlled and there is no chance for carbon contamination.

**35 Resin Core Binder**

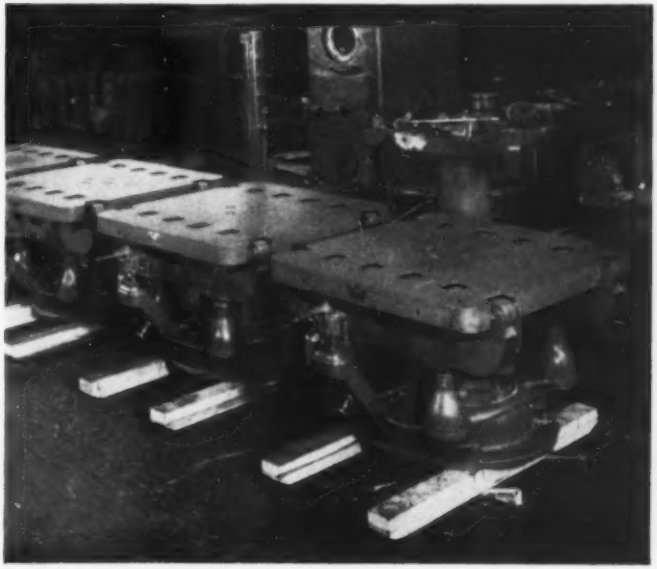
Truline Binder, a dry, pulverized thermoplastic resin used to bind core and molding sands, will be featured in Hercules Powder Co.'s exhibit at the 1952 A.F.S. Foundry Congress & Show. Jesse Gibson, supervisor of Truline Binder sales, and other Hercules technical service represenatatives in the foundry industry will be in attendance at the exhibit.

**36 Foundry Ceramics**

American Lava Corp. will display a complete line of foundry ceramics. Included will be heat resistant work holding devices, welding tips, molten metal troughs, gate tubes, precision cores, strainer or cut-off cores, AlSiMag 564 strainer cores for brass and cast iron, and AlSiMag 202 strainer cores for use with high melting point metals.

**37 Molding Machines**

The plain jolt Model AJ8 molding machines shown in the photograph at right will be a feature of Davenport Machine & Foundry Co.'s exhibit at the 1952 International Foundry Congress & Show. Equipped with roll-out conveyors, the machines have 1800 lb capacity with 26 x 42-in. table and are for making cores for magnesium castings in aircraft engine plants.

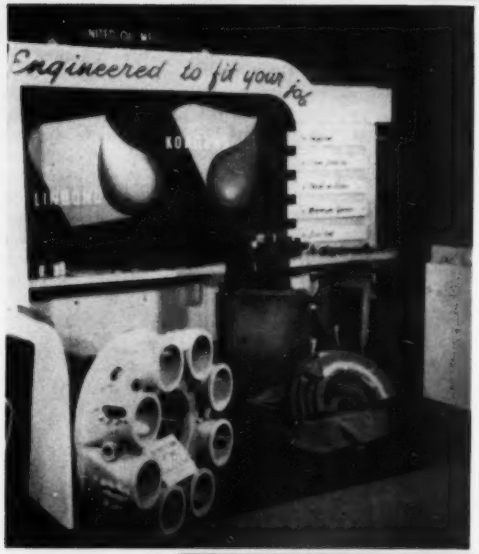


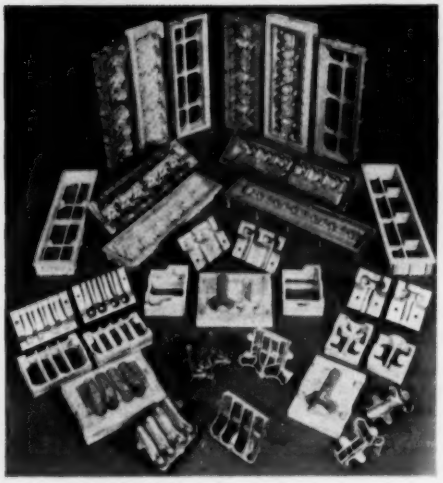
# exhibits preview

**Use postcard on P. 195 for more detailed information.**

**38 Core Binders and Oils**

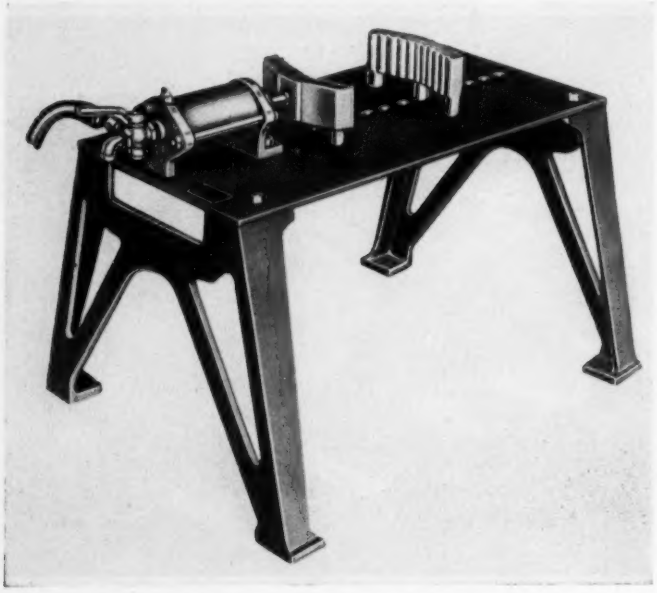
Intricate cores and castings produced with the aid of Aqua-set Core Binders, fast-baking resin type binders that can be dielectrically cured, will be shown by United Oil & Mfg. Co. Other cores on display will be made from Linbond and Korbond Core Oils.



**39 Core Boxes**

Atlas Plastic & Aluminum Pressure Plate Co. will show several types of aluminum core boxes cast in plaster molds, eliminating porosity, a desirable factor in core boxes to be used under a blower.



**40 Crucibles**

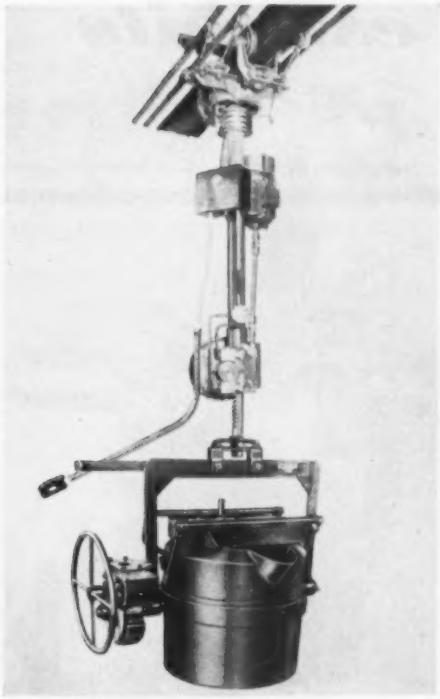
Joseph Dixon Crucible Co.'s exhibit will show Dixon crucibles of many types, stoppers, nozzles and other foundry refractories. Products of other divisions of Joseph Dixon Crucible Co. will also be displayed, including pencil products, paints, graphite and other lubricants and powdered metal products.

**41 Casting Grip**

Joy Manufacturing Co. will display a unique Class CG2 Casting Grip with universal jaws, capable of holding any shape casting, from 2 to 20 inches, for cleaning and snagging operations. Also to be shown are vertical heavy-duty stationary air compressors, the Series 1000 Axivane duct-type fan and industrial electrical connectors for various foundry applications.

**42 Evolution of Pouring Devices** ➡

Modern Equipment Co. will present a 1½ minute color film showing major developments in metal pouring during the last 35 years. Beginning with a pouring device resembling an inverted lifting jack, the film shows such developments as counterweights, mechanical lowering brakes, gears and ratchets, built-in double racks, worms and worm gears. Final result of 35 years of continuous development is the electrically-powered pouring mechanism with geared, insulated ladle shown in illustration at right.

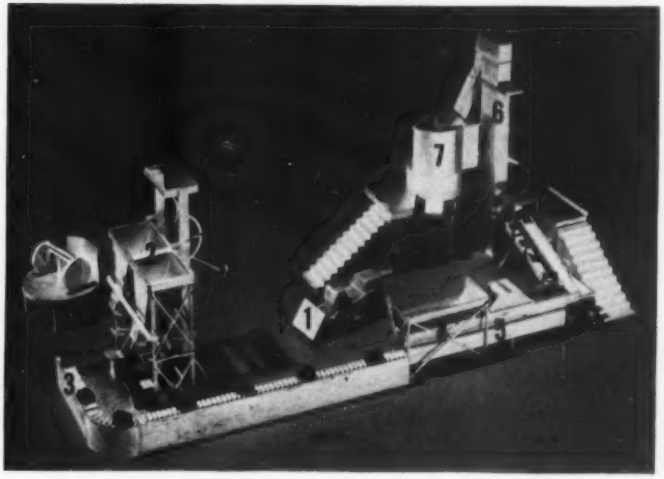


⬅ **43 Sand Controller**

Harry W. Dietert Co. will introduce an entirely new approach to sand testing in the form of a Sand Controller. To be shown for the first time at the Foundry Congress & Show, the Sand Controller is an automatic testing unit that determines and records permeability, green strength, green deformation and temperature of molding sand. Unit adds the correct amount of water to sand in the mixer automatically. Machine may be synchronized with conveyor or mixing equipment.

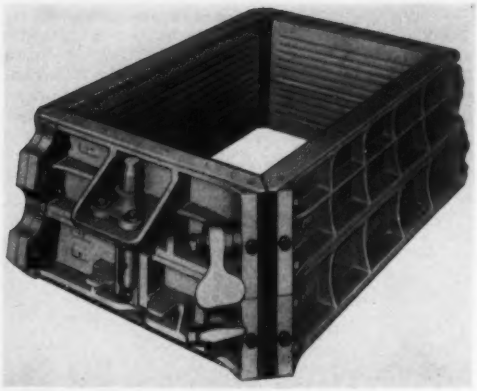
**44 Sand Handling Display** ➡

National Engineering Co. will feature a complete operating exhibit of mold and sand handling equipment, featuring the new Simpson 2F and 3F Mix-Mullers. The larger 3F unit will be shown in a cutaway crib section, while 2F unit will be used in sand handling system, where molds will be produced and handled as follows: (1) prepared sand is charged into bucket loader, (2) bucket charges molders' hoppers, which deliver sand to two molding machines, (3) finished molds to shakeout on roller conveyor, (4) shakeout sand delivered to receiving hopper by front-end loader, (5) shakeout sand is screened and (6) delivered to holding hopper over Muller. Preparing equipment (7) consists of 2F Mix-Mullers with cooling hood, aerator and time controls.



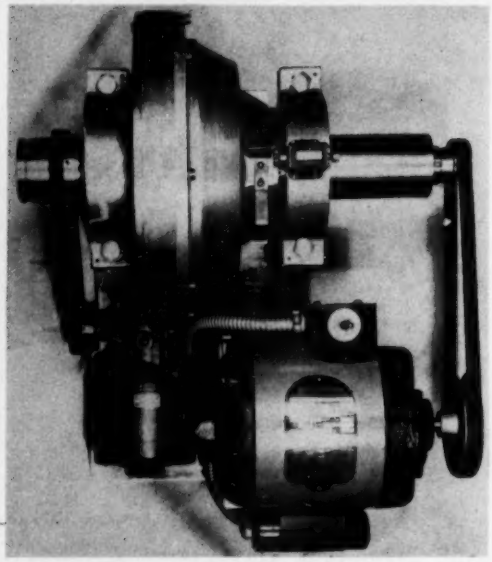
# exhibits preview

Use postcard on P. 195 for more detailed information.



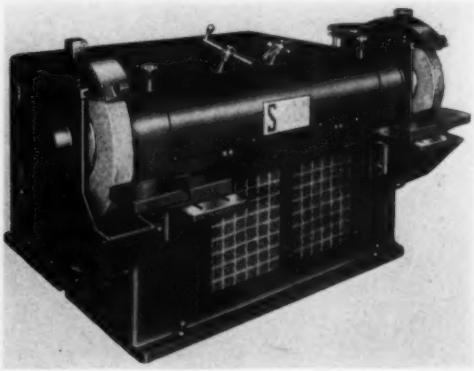
**45 Spreadlock Flask**

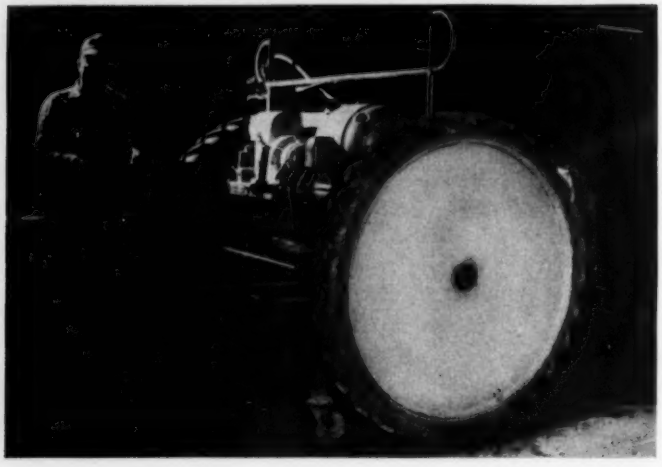
Fremont Flask Co. will have its first public showing of its new Spreadlock Flask at the Show. This new development in flasks features long-life, easily replaceable live rubber corner inserts that completely close corner gaps so that no sand can lodge in open corners. Flasks are also light in weight. Also shown will be standard magnesium slip flasks.



**46 Abrasive Testing Machine**

Alloy Metal Abrasive Co.'s exhibit at Booth No. 302 will feature a new abrasive testing machine that is portable, automatic and gives accurate results. Material is subjected to same conditions as those experienced in a production machine, and results are quickly recorded. Correct answers, that would require many months to determine in a production machine, are obtainable within a few minutes.





**47 Variable Speed Grinder**

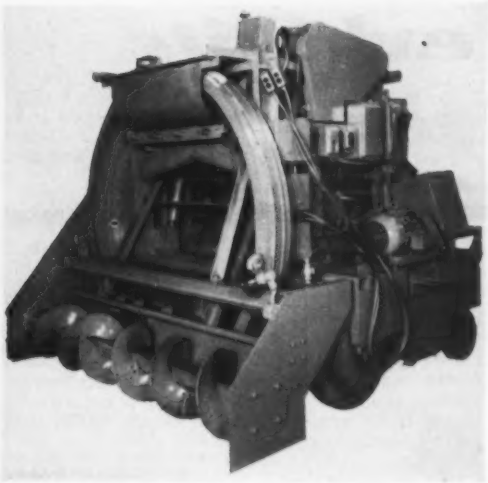
Standard Electrical Tool Co.'s Variable Speed Snagging Grinder insures longer wheel life, lower wheel costs, constant 9500 sfpm throughout wheel life, and with each wheel operating entirely independently of the other will deliver economies in excess of 40 per cent. Available in 20, 24 or 30-in. sizes.

**48 Sand Conditioner**

"The Moulders' Friend" exhibit at the Show will feature the company's latest sand conditioner, equipped with variable speed transmission permitting any travel speed from 5 to 50 fpm forward or reverse. Smaller sand heaps can be conditioned faster than larger ones. One-man machine has 1-ton-per-min capacity.

**49 Induction Melting Furnace**

Tocco Division, Ohio Crankshaft Co., will show its new Tocco Induction Melting Furnace, featuring stepless power control, rapid melting, efficient intermittent operation, natural agitation, low alloy loss, high reproducibility, no carbon pickup, safe operation, and no contamination with composition change.

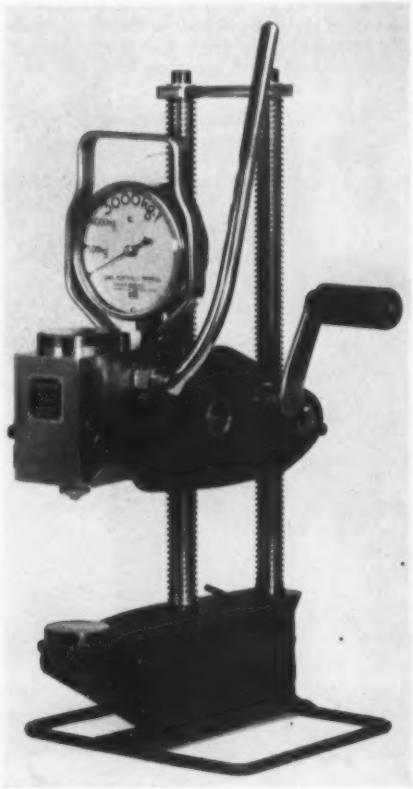


**50 Sand Preparation Equipment**

States Engineering Corp.'s exhibit will feature its Ringlift RF34 sand conditioner, designed for floor preparation of molding sand to be piled at wall or left in windrows of any length. Self-loading, unit has capacity to 60 tons per hour and clears own pathway.

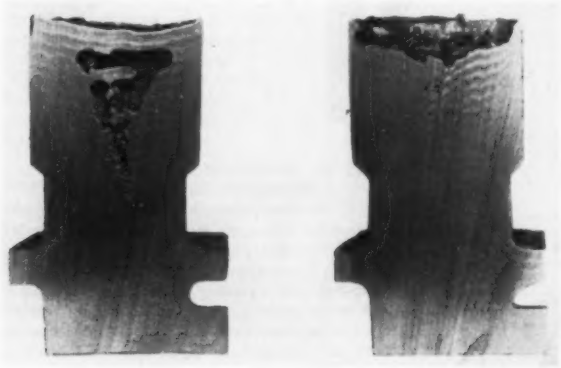
**51 Portable Brinell Hardness Tester**

Andrew King's exhibit will feature the King Portable Brinell Hardness Tester for castings. Unit puts actual load of 3000 kg on 10 mm ball. Weighing only 27 lb, unit performs at the work. Test head is quickly removed from frame for testing parts beyond 10-in. gap height and 4-in. throat capacity.



**52 Thermal Insulating Compound**

United States Graphite Co.'s new Mexatop Thermal Insulating Compound produces risers like one shown at right in illustration when it is used as a topping, in contrast to uncovered riser at left. Features: follows contour of shrinking metal, promotes formation of cup-shaped shrink cavity.

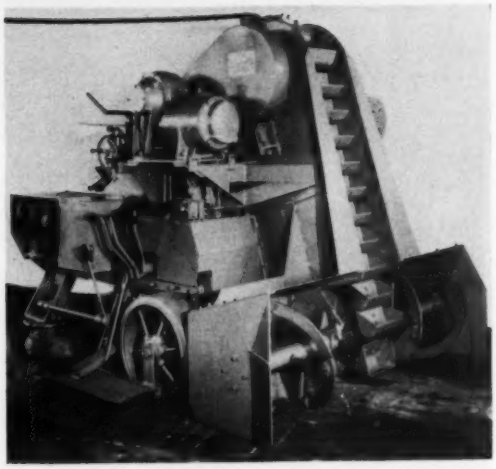


# exhibits preview

**Use postcard on p. 195 for more detailed information**

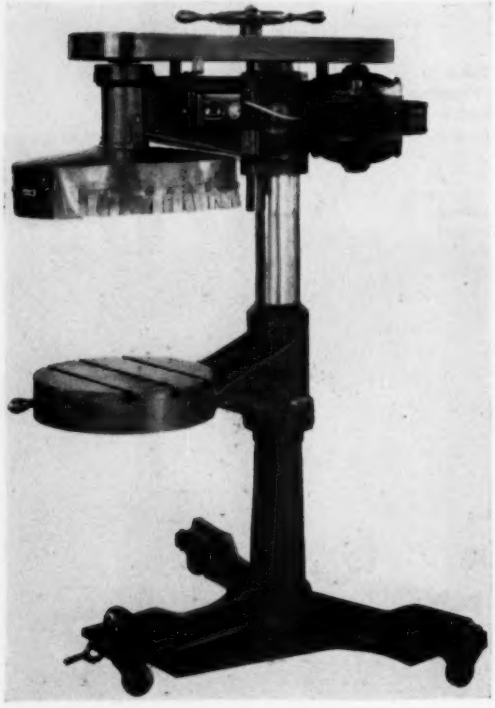
**53 Sand Conditioning Unit** ➡

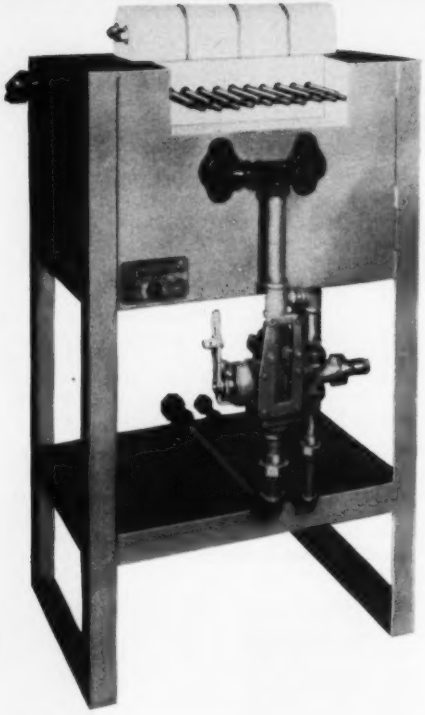
Royer Foundry & Machine Co. will feature a mobile sand conditioning unit in its exhibit. Unit performs all sand preparation operations while moving directly through the windrow. After sand is scooped up, tramp iron is removed, and sand passes into separator for complete mixing and blending prior to discharge from rear of machine at up to 60 tons per hour. Unit is hydraulically driven, highly maneuverable, has variable speeds from 0 to 100 fpm. One man operation.



**54 Tool Re-dressing Furnace** ➡

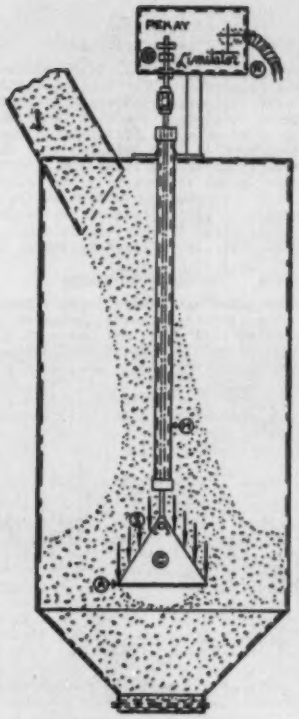
Delaware Tool Steel Corp. will exhibit its new Delaware Forgeatrol Furnace, designed to be used in foundries for re-dressing of chisels and other tools. This new furnace provides true cold shank heating, preventing loss of temper in tool body during re-dressing. Unique "work tile" holds tools in correct position and prevents heat loss from furnace. Tools may be handled without tongs. Hand feeding of forge is fast and accurate, reducing chance of bending tool bodies. Furnace provides heating for forging and tool hardening in one furnace, and has easily controlled temperatures from 1200 to 2800 F.





⬅ **55 Portable Core Grinder**

Spo Incorporated's Milwaukee Foundry Equipment Division will display its new Model 18 portable core grinder, designed to handle a large range of core sizes and to produce uniformly flat faces without broken edges. Grinder employs 18-in. grinding wheel mounted on adjustable head that locks firmly in any position. Maximum clearance between table and grinder face is 18 in.; maximum working capacity is 15 x 24 in. Machine can handle cores of one size in production quantity, or quickly adaptable to short runs on other sizes.




**56 Hopper Control**

Pekay Machine & Engineering Co. will show its new Limitator for accurate control and/or indication of level of granular, crushed or liquid material in bins and hoppers. Unit is quickly adjustable to any desired level by outside selector screw and can be adapted to automatic signal, cut-off or materials flow re-start.

**57 Pneumatic Tools**

Master Pneumatic Tool Co., Inc., will show its complete new line of Master Power tools for use in the foundry. Featured will be the new Model M-612 and Model M-613 short heavy duty air-powered die grinders for cleaning of castings and deburring and cleaning or smoothing of welds. Both tools are light in weight and have extremely high power at free speeds of 20,000 or 17,000 as desired by user.

**58 Metals Lubricant**

Climax Molybdenum Co.'s new Moly-sulfide, a metals lubricant designed to be effective where other lubricants fail, is well suited for prevention of galling and seizing of even the softest metals. Moly-sulfide can be used as an aid in assembly and disassembly of close-fitting parts; as a lubricant in hot and cold working of metals, or for flask pins; as a dielectric lubricant; and as a non-dust-collecting lubricant.

**59 Foundry Refractory Materials**

Laclede-Christy Co., St. Louis, and its distributors—G. & W. H. Corson Co., Inc., Astell Refractories Co., and Corson Refractories, will exhibit refractory materials pertinent to all foundry applications at their booth 1802-1804 at the International Foundry Show.

**60 Automatic Shell Molding Machine**

Demonstrations of the revolutionary shell molding process with an automatic shell molding machine will be one of the chief features at Monsanto Chemical Co.'s exhibit. To be operated two to four hours daily, the automatic machine will turn out 45 shells an hour using Resinox phenolic resin and sand. A number of shell molds thus made will be on display at the Monsanto booth. The molds and castings have been contributed by foundries all over the country. Applications of Resinox resins as a core binder will also be shown in the exhibit.

**61 High-Temperature Refractories**

National Foundry Sand Co.'s exhibit will feature a complete new line of extreme heat-resisting foundry refractory materials. The Hy-Temp Refracto line consists of bricks in all shapes, bonding cements and lining and bottom materials for electric furnaces. Hy-temp Refracto products are varied in formulation, while similar in composition, so that each is suited to a specific foundry purpose.

HY-TEMP REFRACTORY MATERIALS REFRACTO

Exhibits Preview

52|4

**Please send me detailed information on the Products and Processes and Free Foundry Information circled.**

1 2 3 4 5 6 7 8 9 10 11 12 13 14

15 16 17 18 19 20 21 22 23 24 25

26 27 28 29 30 31 32 33 34 35 36

37 38 39 40 41 42 43 44 45 46 47

48 49 50 51 52 53 54 55 56 57 58

59 60 61

★ Please print or type information below

NAME

TITLE

COMPANY

ADDRESS

CITY AND ZONE

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

**BUSINESS REPLY CARD**

First Class Permit No. 14680, Sec. 34.9 P. L. & R., CHICAGO, ILL.

Reader Service

AMERICAN FOUNDRYMAN

616 S. Michigan Avenue

Chicago 5, Illinois

# free/foundry information

**For additional information,**

**use postcard at bottom of this page**

### 401 High-cycle tool advice

Slanted for those using 180 or 360-cps electric tools, 12-page Bulletin 39 offers information on maintenance, application, and safety. Data is general and applies to all makes. Cartoons point up the advice. *Rotor Tool Co.*

### 402 Molding machines

Illustrated in two colors, 12-page bulletin "Tabor Molding Machines That Work Miracles" describes and specifies those machines having greatest versatility for short or long run production work. Units featured are jar squeezers, jarring machines, rollovers, flask lifts, and vibrators. Also featured is a cope and drag team. *Tabor Mfg. Co.*

### 403 Universal testers

Hydraulic universal testing machines are fully described, illustrated, and specified in the 32-page Catalog RU-7-52. Four models are covered, composed of various combinations of loading and indicating units. Top capacity is 400,000 lb. Catalog also includes a section on accessories and instruments. *Riehle Testing Machines Div. of American Machine & Metals, Inc.*

### 404 Foundry instrumentation

Lead article of "Wheelco Comments", Vol. 11, No. 2, describes the application of strip chart recorders, controllers, and combustion safeguards in a foundry producing permanent mold and die castings. *Wheelco Instruments Co.*

### 405 For moving the air

Bulletin DF-5 describes a device for moving large volumes of air quickly in situations requiring intermittent or emergency ventilation. Steam or compressed air is fed through a side inlet at one end. Expanded at high velocity, it is discharged through the outlet horn, drawing with it the atmosphere to be moved. There are no moving parts to replace or maintain. All three models are detailed in the 4-page, 2-color bulletin, which is illustrated. *Mine Safety Appliances Co.*

### 406 Valves and fittings

New periodical, "Valve Topics", should interest those who specify, design, or use stainless steel valves and fittings. It will provide news and information on uses and abuses, applications, and such special features as current literature, questions and answers, and specific valve problems. One request puts you on the permanent mailing list for future issues. *Cooper Alloy Foundry Co.*

### 407 Electrodes and alloys

Profusely illustrated 16-page directory contains photographs, data, and technical information on a series of welding alloys and electrodes for use on cast iron, steel, alloy steels, copper, brass, bronze, aluminum, magnesium, hard and machinable overlays. Two full pages are devoted to a chart of over 100 different alloys, showing their main uses, bonding temperatures, and tensile strength, and offering many ideas on effective uses of welding. Information is direct and well-organized. *Eutectic Welding Alloys Corp.*

### 408 Fire fighting film

Eighteen-minute color and sound film called "Not Too Hot to Handle" demonstrates approved fire extinguishing equipment and procedures for class A, B, and C fires. Professional technicians are shown using all recognized types of portable extinguishers. Wood, flammable liquid, and electrical blazes are handled. Agents demonstrated include water, soda acid, carbon dioxide, dry chemical, foam, and vaporizing liquid. *Walter Kidde & Co., Inc.*

### 409 Find weight of castings

Three-color slide rule gadget will show the weight of a casting when the proper variables are aligned. Called "Casting Weight Calculator", it is made of heavy cardboard with specific instructions and conversions on the back. *National Engineering Co.*

### 410 Materials handling study

Second in a series of case study reports, No. 242 shows how a Georgia metal working plant has cut its materials handling costs 36 per cent by installing Baker fork trucks. Report contains action photos showing unloading and production handling. *Baker Industrial Truck Division, Baker-Raulang Co.*

### 411 Conveyor analysis forms

Sample set of conveyor analysis forms, available gratis, enables the foundryman to (1) analyze his handling problems, (2) locate new sources of production efficiency through better handling, and (3) estimate present cost of materials handling. *Logan Co.*

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

**BUSINESS REPLY CARD**

First Class Permit No. 14680, Sec. 34.9 P. L. & R., CHICAGO, ILL.

**Reader Service**

**AMERICAN FOUNDRYMAN**

**616 S. Michigan Avenue**

**Chicago 5, Illinois**

Reader's Service Dept.

52|4

**Please send me detailed information on the Products and Processes and free Foundry Information circled.**

401 402 403 404 405 406 407 408

409 410 411 412 413 414 415 416

417 418 419 420 421 422 423 424

425 426 427 428 429 430 431 432

433 434 435 436 437 438 439 440

*** Please print or type information below**

NAME

TITLE

COMPANY

ADDRESS

CITY AND ZONE

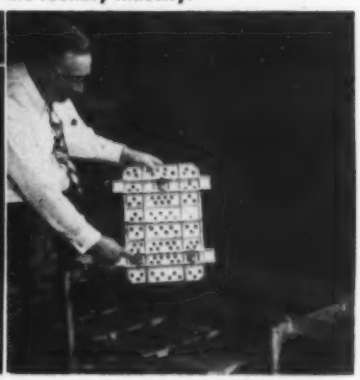
ARROW PATTERN & FOUNDRY COMPANY of CHICAGO

# BOOSTS PRODUCTION

## with WESTOVER ENGINEERS

# NOMAD CONVEYOR SYSTEM!

**A universally needed development of Westover Engineers, resulting from 25 years of method studies as engineering consultants to the foundry industry.**



*At Arrow Molding Station, mold on bottom board is moved on track with gentle shove toward Pouring Station. After shakeout, bottom boards return automatically by gravity and cycle is repeated.*

*Arrow Vice-President Harry Swanson shows a Nomad aluminum bottom board with ball-bearing rollers.*

## Nomad flexibility brings new efficiency to any foundry layout!

This entirely new foundry conveyor system is "based on a principle as logical as mounting a boxcar on wheels." Yet Arrow Pattern & Foundry Company of Chicago reported a 15% production increase the first day of operation. Numerous specially engineered NOMAD systems have been installed involving the use of curves, switches, transfer cars, and sloped sections. Whatever the space and mobility problem, NOMAD conveyor facilities can be assembled in a wide variety of combinations to bring new and profit-making foundry efficiency.

NOMAD Foundry Equipment engineers are available to assist in laying out the equipment for you to make the most efficient use of your facilities... to bring to your operation increased production through reduction in lost molds, lower maintenance costs and an overall substantial saving in time and manpower.

**THESE ARE NOMAD'S REVOLUTIONARY FEATURES:**

1. **No Vibration during Travel:** Bottom board location of rollers and smooth, level track guarantee against vibration.
2. **Effortless Moving:** Twin rows of ball bearings in the rollers permit moving with minimum friction.
3. **Self Cleaning:** Entire assembly is constructed to shed sand accumulation. Top rail is self-cleaning.
4. **Low Maintenance Cost:** Non-lubricating bearing eliminates greasing and oiling. Cleaning time minimized by self-cleaning open construction.
5. **Low Initial Cost:** Case histories show offset of initial cost in only three months.

**See a demonstration of NOMAD Conveyors at Atlantic City... in both the Westover and Newaygo Booths.**

*For complete story on Arrow Pattern & Foundry Company's use of Nomad equipment, see February issue of American Foundryman.*

NOMAD FOUNDRY EQUIPMENT

U. S. Patents; Pats. App. for

Manufactured by

WESTOVER ENGINEERS

WESTOVER ENGINEERS

3110 W. FOND DU LAC AVENUE • MILWAUKEE 10, WISCONSIN

*DISTRIBUTED BY*

**JOHN B. SKELLY**

232 HOME AVENUE • OAK PARK, ILLINOIS

*AND*

**NEWAYGO ENGINEERING COMPANY**

*NEWAYGO, MICHIGAN*

**These Products are *LEADERS* in Core Box Protection by MARTIN**

**"SAND ARRESTER TUBE"**
Save cores and step up production. Guaranteed for 100,000 blows.

**"HOLINER" BUSHINGS**
Stop abrasion between blow plate and core box. Protect blow holes.

**"PROTEXABOX PINS"**
Cannot mar the box face because they will not loosen. Protective rubber tip guaranteed to stay on.

**"PULLINSERT" BLOW BUTTONS**
Positively stop sand blasting under blow holes. Available in nine popular sizes.

**"STRIPINSERT"**
Protects parting line—easily installed in old or new boxes. Cutters for groove available at moderate cost.

Rugged all-directional vibration that does not harm the faces of your sand hoppers or bins. Instantly self-starting, needs no lubrication or maintenance. Specify — the Peterson VIBROLATOR.

***and NOW...*** **A NON-BINDING FLASK PIN**

No more production stoppages due to bending or binding of flask pins. No matter how much abuse these pins receive, they flex and absorb it without binding or breaking. They don't require excessive tolerances or skilled labor.

**WRITE** for descriptive literature or ask your distributor.

**MARTIN ENGINEERING COMPANY**
KEWANEE 3, ILLINOIS


## *chapter news*

*continued from page 180*

Mr. Romanoff pointed out the advantages of manganese brasses for high strength and salt water corrosion resistance. Aluminum and iron exert a grain refining influence on these alloys. These alloys become brittle when the copper content is low (in the beta range). Raising copper content or reducing zinc content by flaring to produce the alpha phase restores toughness and ductility.

The aluminum bronzes are important non-ferrous alloys requiring special attention to feeding and chilling for successful foundry practice. Aluminum content above 9.5 per cent in this bronze produces a delta constituent which makes them very brittle. Slow cooling also produces a self annealing tendency. Solution heat treatment at 1600 F, quench and anneal at 900 to 1100 F, and air cool will produce maximum properties in this alloy.

## Other Organizations

**New England Foundrymen's Association**
MYRON DE HOLLANDER
*General Electric Co.*

The March 12 meeting, held at the Parker House, Boston, was attended by 170 foundrymen (including four M.I.T. students) from the Boston vicinity.

Following a short business meeting conducted by association president Frank R. Elliot, E. I. Valyi, Shellmold Machine Co., Inc., New York, was introduced. Dr. Valyi is a graduate of the Federal Polytechnic Institute of Zurich, Switzerland. He described the general principle and equipment needed in the production of shell molds, stating that considerable progress is being made in the automobile, farm equipment, and machinery industries. He also touched upon production possibilities, yield, cost, and possible applications for this process. A lively discussion period followed the presentation.

February 13 meeting, attended by 130 members and guests, was held at Boston's Hotel Somerset. Speaker William Demler, Harbison-Walker Refractories Co., thoroughly reviewed basic cupola practices, with particular reference to uses of basic refractories.

Some 50 foundries now operate basic cupolas, Mr. Demler said in discussing the various types of refractories used in basic cupola operation. Basic cupolas are highly advantageous in the production of nodular iron, Mr. Demler said, because of their ability to produce iron of low sulphur content. Mr. Demler concluded by presenting facts about patching material, front and rear slag holes, sand bottoms, and compared costs of basic operation with costs of operating an acid cupola.

# book reviews

## Corrosion

*Corrosion—Causes and Prevention* . . F. N. Speller. 650 pp. Illustrated. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $10.00. (1951)

Third edition of this reference volume discusses the theory of corrosion and describes various methods for preventing it. Particular emphasis is placed on ferrous metals. Highlights are the coverage of cathodic protection and the latest information on biological influences. Data on calculating corrosion rates, conversion tables, tests for determining corrosive activity, alloy analysis, and glossary of terms are included in the appendix.

## Fundamental timestudy

*Timestudy Fundamentals for Foremen* . . Phil Carroll. 209 pp. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $3.00 (1951)

The practical information contained in this book will be useful to foremen, supervisors, and union leaders who want to know how to use timestudy as a tool to improve job performance and increase production. Information is all basic, and includes self-test questions, cartoons, and simple diagrams.

## Solving problems

*Essentials in Problem Solving* . . Zuce Kogan. 76 pp. Published by Zuce Kogan. 724 Sheridan Road, Chicago 13. $3.00 (1951)

Illustrated by actual examples, this paper-bound book offers basic principles of a workable approach to solving problems, both general and technical.

## Phase diagrams

*Phase Diagrams for Ceramists* . . F. P. Hall and Herbert Insley. 152 pp. Published by The American Ceramic Society, Inc., 2525 N. High St., Columbus 2, Ohio. $5.00 with paper cover; $7.00 hard-bound. (1947)

This book gives an explanation of phase equilibria, covers the mechanics of crystallization, and presents a compilation of phase diagrams. Although aimed directly at ceramists, it has considerable application in other diverse fields.

## Furnace data

*Industrial Furnaces, Vol. 1* . . W. Trinks. 526 pp. Illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $10.00 (1951)

Now in its 4th edition, this book incorporates recent facts on heat transfer and furnace design as well as present-day design, operating principles, and techniques. It not only lays down and discusses the basic principles underlying all furnace design and operation, but also offers conclusions which have been tested and proved in actual furnace practice. About 40 per cent of the text has been completely rewritten; tables have been rechecked, and many of the statements have been clarified.

## Manufacturing processes

*Manufacturing Processes* . . M. L. Begeman. 608 pp. Illustrated with photographs, drawings, and diagrams. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $6.00. (1952)

This third edition is written primarily for students and professionals engaged in production, industrial, or tool engineering work. It gives detailed information on all the important manufacturing processes and machines now available—where they can best be applied, their advantages and drawbacks, the tools needed for each machine, etc. The first half is devoted to foundry practice, pattern work, plastic molding, powder metallurgy, hot and cold working of metals, heat treating, and welding. The second half covers measuring instruments, cutting tools, machines, and their accessories. Book has been completely revised, with much new material added.

*Portable bank of six lightweight Chromalox 2½-KW electric radiant heaters is easily moved from mold to mold; provides uniform, wide-band infrared heat with an even degree of penetration that eliminates moisture pockets, yet does not burn high spots. Handles on each end of bank make handling easy.*

## Foundry Gets Extra Mold Daily for 2000-Lb. Casting

*Milwaukee, Wisconsin*—A local foundry has added an extra unit to its daily production of large sand molds, without adding manpower, by changing to Chromalox Electric Radiant Heat for skin drying. As molds are used for 2000 to 3000-pound castings, production boost represents a substantial increase. Other advantages achieved with new drying method are: uniform drying of mold surfaces; quick warm-up; heat confined to work; and no toxic gases.

Drying was previously handled manually with an open kerosene torch, a hot, disagreeable task requiring full-time services of one man, and subject to human error. Occasional burning of some mold spots and incomplete drying of others often caused scrapping.

Two new drying units each consist of six 2½-kw, all-metal, Chromalox Electric Radiant Heaters with handles on each end of heater bank for easy portability. Heaters radiate long wave length, unfiltered infrared heat that is absorbed uniformly. Heaters can be switched on and off in groups of three. Rugged and compact, heater banks have now been in use for many months without damage.

Success of this Chromalox Electric Radiant Heater installation has, according to the plant's assistant superintendent, led this company to plan on four more similar setups.

**WRITE FOR MORE INFORMATION**

EDWIN L. WIEGAND CO., Industrial Div. 88-22
7609 Thomas Boulevard, Pittsburgh 8, Pa.
I need infrared heat for _____
Send me application file on above.
Name _____
Company _____
Street _____
City _____ State _____

CHROMALOX
THE BEST IN ELECTRIC HEAT

# STEEL FOUNDRIES

*Yes, it's—*

**NON-TOXIC**

**Non-Irritating...**

**Superset**

**DRY CORE BINDER**

- **It's the DRY Core Binder that SAVES . . .**

**By assuring you a truly DRY binder that gives off NO OBNOXIOUS FUMES or odor at the shake-out . . . By giving you less scrap due to underbaked cores . . . By enabling you to reduce oven temperature 75° to 100° or reduce time cycle and thus increase oven capacity by one-third . . . By giving you cores that lose less strength in storage and provide greater collapsibility.**

"With SUPERSET we are able to save so much time we have completely licked our problem of meeting schedules in foundry production—" This is what one coreroom foreman says . . . And in many steel foundries today SUPERSET is giving more satisfactory cores FASTER and at LESS COST.
Write us . . . We will make arrangements for our technical representative to call and demonstrate SUPERSET in your foundry.

© 1952

**Stoller Chemical Co.**

225 W. Exchange Street . . . . . AKRON 8, OHIO


## *abstracts*

**Abstracts below have been prepared by RESEARCH INFORMATION SERVICE of The John Crerar Library from current American and foreign literature. For literature searches and translations of technical, industrial, and scientific literature, and photostats and microfilm, write to: Research Information Service, The John Crerar Library, 86 East Randolph Street, Chicago 1, Illinois. Rates for the above services will be furnished upon request.**

### Aluminum from red brass

**A176** . . "The Removal of Aluminum from Red Brass," A. V. Larsson and B. Lofgren, *Gjuteriet*, Vol. 41, October 1951, pp. 143-151. (In Swedish)

Aluminum can be removed from red brass melts by refining with fluoride-bearing fluxes. Normal soundness and mechanical properties of the brass seem to be regained after such treatment. Silicon can be removed by the same methods, if the melt is free from aluminum. Sulphur pick-up is too small to affect mechanical properties.

### Contaminated melts

**A177** . . "Contamination of Non-ferrous Foundry Melts," A. L. Simmons, *Metal Progress*, December 1951, pp. 74-75.

Steel inadvertently mixed with brass raised iron content well above maximum specifications. Mathematical computations show how remelting the faulty ingots with ingots of normal iron content reduced iron content of resultant ingots to below maximum. Also shown is graph for determining proper proportions of contaminated material to clean material and circulating scrap.

### Blocking radiant heat

**A178** . . "Radiation Screens Improve Work Conditions in Hot Spots," George F. Haines, Jr., *Heating, Piping & Air Conditioning*, September 1951, pp. 96-97.

General ventilation is of little value against radiant heat. Screening, however, may be readily applied to improve work conditions. Screens may be opaque or transparent, permanent or movable, and made from many materials, commonest of which are listed in a table. Another table shows reduction in radiation afforded by a typical screen of aluminum foil.

### Sand collapsibility test

**A179** . . "Core Sand Collapsibility Test," I. J. Birch, *Foundry Trade Journal*, Vol. 91, November 22, 1951, pp. 595-596.

The dry compression figure for a standard A.F.S. core does not give a true indication of its collapse under casting conditions. A simple method that gives reproducible results is to

736 Iowa Ave., Saginaw, Michigan

First Complete Reference Book for Cupola Operations

**CUPOLA OPERATIONS HANDBOOK**

Complete reference book on Cupola Operation in all its phases. A total of 128 outstanding foundry metallurgists and cupola operators contributed to text.

Highlights include: Operation of the Cupola, The Refractory Lining, Blowing Equipment and Blast Control Equipment, Forehearth and Receiving Ladles, Blast Conditioning, Classification of Scrap for Cupola Mixtures, Foundry Coke, Cupola Slags, Fluxes and Fluxing, and Fundamental Thermo-Chemical Principles Applicable to Cupola Operation.

First Edition — cloth bound . . . 468 pages . . . 188 graphs and illustrations . . . 34 tables . . . extensive bibliographies and index.

**$6.00 A.F.S. Member Price**
**$10.00 Non-Member Price**

**AMERICAN FOUNDRYMEN'S SOCIETY**
616 S. Michigan Ave. Chicago 5, Ill.


carry out a standard dry-compression test after using the core in a pouring operation. Standard conditions are given, and effects of various factors are graphed.

## Oxygen enrichment

**A180** . . "Oxygen Enriched Cupola Blasts," Roger O. Day, *Canadian Metals*, Vol. 14, No. 12, December 1951, pp. 22-27.

The use of oxygen to enrich the air blasts of cupolas offers many advantages, including higher iron-coke ratios, efficient operation on low quality coke, and rapid increase in combustion temperatures and melting rates. This method substantially decreases the amount of rejects and does not affect the cupola lining or alter the pattern of cupola operation.

## Shell molding

**A181** . . "Jobbing Foundry Adopts C-process for Making Shell Molds," A. W. Calder, Jr., *Iron Age*, Vol. 168, November 15, 1951, pp. 111-116.

Shell molding can produce from 90 to 110 molds in 8 hours. The advantages of using castings made by this shell process are: a saving in metal and alloys; machinery costs are cut 55% over the same parts produced by green sand method; a better surface finish and definition of the pattern design; closer tolerances can be obtained. Originally, this process was considered economical in mass production shops only, but it is now paying off in a jobbing foundry.

## Steel casting tricks

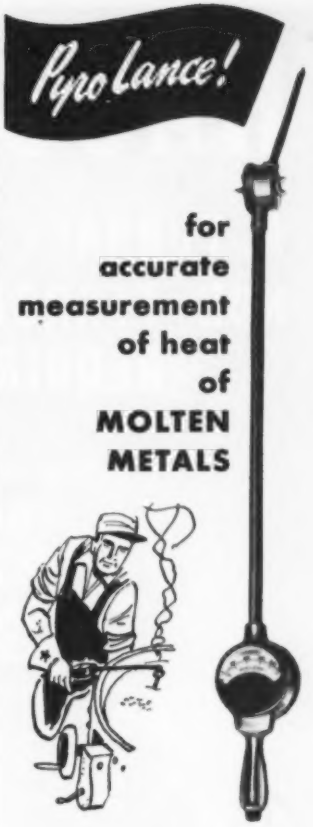
**A182** . . "Problem Castings Can be Turned into Production Jobs," T. J. McLeer, *Iron Age*, Vol. 168, November 22, 1951, pp. 86-89.

A stainless steel foundry has substantially reduced such problems as distortion, shrinkage, and feeding difficulties that occurred in five problem castings. This was accomplished by a new type of gating, a particular core mixture, change of design, use of green sand in the mold, and the use of circular segmented external steel chills.

## Die castings

**A183** . . "Copper-Base Die Castings Now More Widely Used," B. Johnson and S. E. Gregory, *Materials and Methods*, Vol. 34, October 1951, pp. 92-94.

Casting copper-base alloys in permanent molds offers the usual advantages of die cast parts—they can be produced to close tolerances in the original operation without waste of metal in machining or working to final form. Surface finish is good enough to permit use as the piece comes from the mold, thinner sections can be cast in permanent molds, production rate is high, and physical properties are good. A disadvantage in the case of pressure casting is the tendency of the surface to show pinpoint porosity.


**For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface —unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 557, 420 N. LaSalle St., Chicago 10, Illinois.**

*Alnor*

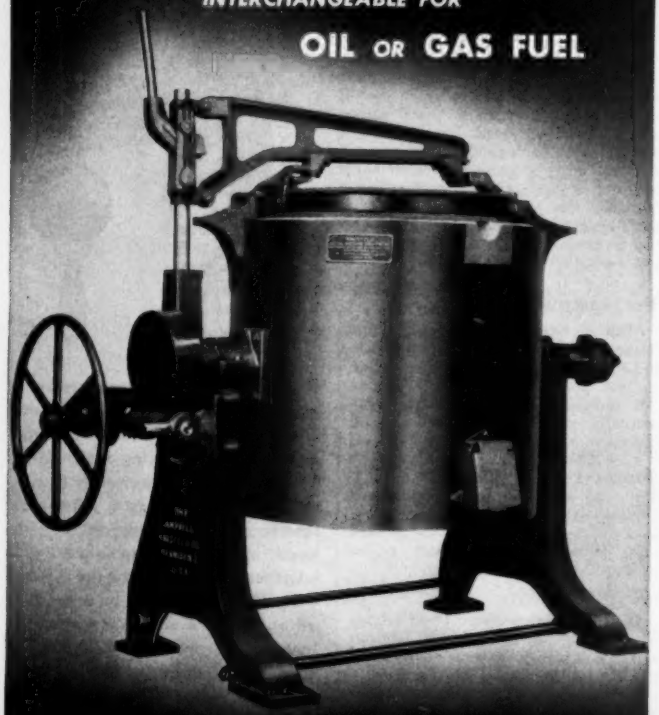
PRECISION INSTRUMENTS FOR EVERY INDUSTRY

# HAUSFELD

## A FURNACE FOR EVERY NON-FERROUS MELTING REQUIREMENT

INTERCHANGEABLE FOR

OIL OR GAS FUEL



*Built for Service*

**The Campbell-Hausfeld Co.**

**900-920 MOORE ST. HARRISON, OHIO**


## *coming events*

### April

**16 . . Central Michigan**
Hart Hotel, Battle Creek, Mich. Fred G. Sefing, International Nickel Co., N. Y. *"Foundry Education."*

**17 . . Washington**
Frye Hotel, Seattle. Donald McCutcheon, Ford Motor Co., Dearborn, Mich. *"Non-Destructive Testing."*

**18 . . Northwestern Pennsylvania**
Beacon Inn, Meadville, Pa. D. C. Williams, Ohio State University. *"Sand Practice."*

**18 . . Eastern Canada**
Mt. Royal Hotel, Montreal. Quiz Night: *"Problems in the Cleaning Room."*

**18 . . Texas**
Afternoon: Plant Visits to Texas Foundries, Inc. and Lufkin Foundry & Machine Co., Lufkin, Texas. Evening: Angelina Hotel, Lufkin. Harry W. Dietert, Harry W. Dietert Co., Detroit. *"Analyzing Foundry Problems."*

**21 . . Quad City**
Fort Armstrong Hotel, Rock Island, Ill. George Anselman, Beloit Foundries, Inc., Beloit, Wis. *"Casting Defects."*

**24-25 . . Time Study & Methods Conf.**
Hotel Statler, New York. Sponsored by Society for Advancement of Management.

**25 . . Chesapeake**
Engineers' Club, Baltimore, Md. W. A. Morley, Olney Foundry, Link-Belt Co., Philadelphia, Pa. *"How to Start to Mechanize a Small Foundry."*

**26-May 11 . . Liege International Fair**
Liege, Belgium.

**27-May 1 . . American Ceramic Society**
Annual Meeting, William Penn Hotel, Pittsburgh.

**29-30 . . Metal Powder Association**
Drake Hotel, Chicago. *"Powder Metallurgy in a Defense Economy."*

### May

**1-7 . . Intl. Foundry Congress & Show**
Atlantic City, N. J.

**1-7 . . Non-Ferrous Founders' Society**
Atlantic City, N. J. Annual Meeting.

**5-6 . . National Air Pollution Symposium**
Huntington Hotel, Pasadena, Calif. Sponsored by Stanford Research Institute, California Institute of Technology, University of California at Los Angeles, and the University of Southern California.

**7-10 . . Apprenticeship Conference**
Sheraton-Biltmore Hotel, Providence, R. I. Eighth Annual Eastern Seaboard Apprenticeship Conference, sponsored by Rhode Island State Apprenticeship Council.

**9 . . Eastern Canada**
Mt. Royal Hotel, Montreal. Annual Business Meeting—installation of officers and presentation of prizes.

*continued on page 204*

# Headquarters for PATTERN SHOP SUPPLIES

***SUPERIOR PATTERN PLATES • ALL PLATES READY FOR MOUNTING***

★ **Superior Noslip machined and sand blasted**

★ **Superior Cast Flat straightened and ground**

★ **Superior Offset 45° offset straightened and ground**

- **Superior Ribbed Cope and Drag Plates—all sizes ½", ¾" and 1" thick. Ribs 1¾" high.**
- **Superior Sheet Wax. .0015 to .375 thick in 8 x 12" and 12 x 24" sheets.**
- **Superior Wax Fillet. 1/32" to 1" radius packed 1 lb. rolls 2 lb. boxes.**
- **Superior Core Vent Waxes. Black for iron and steel castings in formula for year around use. Yellow in solid and hollow for magnesium and aluminum.**
- **Superior Wood Fillet. ¼" to 3". Superior Cold Glue.**
- **Superior Pattern Lagging and Superior Plastic Metal.**
- **Superior Disc Cement (rubber latex formula). Superior Fillet Cement.**
- **Complete line of Supplies and Machinery.**

***Write for catalog and quotations. . . Superior products for the pattern shop***

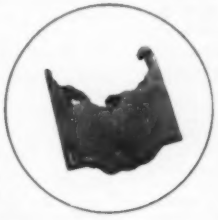
## the P.M.S. Co.

**1071 Power Ave. • Phone MA 1-9624 • CLEVELAND 14, OHIO**

HOW MUCH DO YOUR *Risers* COST

Photo No. 5, at left, shows ordinarily large riser necessary to feed casting adequately where ineffective carbonaceous Anti-Piping compound was used. Secondary shrinkage extended well below bottom of shrink cavity. Three points of carbon pick-up were found in metal sample taken from riser neck.

Photo No. 1, at right, shows riser of casting from same pattern on which Exothermic Red "LIQUID RISER" Compound was applied. Note shallow, cup-shaped shrink cavity and absence of secondary shrinkage. No carbon pick-up evident. The intense exothermic action of Red "LIQUID RISER" enabled pouring this riser 30% shorter than in Photo No. 5 with resultant increase in yield and reduction of waste metal remaining in riser after casting had solidified. The amount of Red "LIQUID RISER" required to produce this result represented an investment of 10¢ for the material. The direct saving in metal cost alone amounted to $15. It is easily seen from the Photograph that Riser No. 1 could have been poured still shorter with even greater metal saving and without any increase in the amount of Red "LIQUID RISER" necessary.



**EXOTHERMIC RESEARCH PRODUCTS, Inc.**
**405 Peckham St.**
**BUFFALO 6, N. Y.**

The above was not a special laboratory case; you can reduce riser costs in YOUR foundry through the use of our Exothermic Riser Compounds!

Write for our illustrated booklet, **"The Feeding Problem,"** which describes in detail the characteristics and applications of our Exothermic Products. SAMPLES GLADLY SUBMITTED ON REQUEST.

Looking forward to meeting you in Booth 207 in May!

A small investment of

$7.60

A small investment of $7.60 for a CLEVELAND Air Vibrator, has been a big factor in better castings production per molder in foundries everywhere. This has been true for 27 years.

Seven sizes available.

IMMEDIATE DELIVERY!

| Piston Size | Price | No. Required |
|---|---|---|
| ⅜" SA | $ 7.60 | |
| ½" SA | 7.60 | |
| ⅝" SA | 8.00 | |
| ¾" SA | 8.25 | |
| ⅞" SA | 10.45 | |
| 1" SA | 11.70 | |
| 1¼" SA | 16.00 | |

Name_____

Company_____

Address_____

City_____ State_____

The type SA is part of the well-known, carefully engineered Cleveland line of quality air vibration equipment.

THE CLEVELAND VIBRATOR COMPANY

2787 Clinton Ave. • Cleveland 13, Ohio


## coming events

*continued from page 202*

**12 . . Central Ohio**
Seneca Hotel, Columbus. John A. Mescher, Unitcast Corp., Toledo, Ohio. *"Core Practice and Core Blowing."*

**12 . . Central Illinois**
American Legion Post No. 2, Peoria. K. W. Haagensen, Allis Chalmers Mfg. Co., Milwaukee. *"What Kind of Salesman Are You?"*

**13 . . Twin City**
Covered Wagon, Minneapolis. Donald J. Murray, The Borden Company, New York. *"Resin Bonded Core Sands."*

**13 . . Rochester**
Seneca Hotel, Rochester, N. Y. Election of officers.

**13 . . Chicago**
Chicago Bar Association, Round Table Meeting.

**14-16 . . Stress Analysis Conference**
Hotel Lincoln, Indianapolis, Society for Experimental Stress Analysis.

**15 . . Western New York**
Sheraton Hotel, Buffalo, N. Y. Election o Officers.

**16 . . Texas**
Ben Milam Hotel, Houston. Annual Business Meeting—election of officers.

**16 . . Central New York**
Hotel Onondaga, Syracuse, N. Y. E. S. Bowers, Monsanto Chemical Co. *"Shell Molding."*

**16 . . Ontario**
Royal York Hotel, Toronto. Annua Meeting and entertainment.

**19 . . Central Indiana**
Athenaeum Turners, Indianapolis. George Anselman, Beloit Foundry Co., Beloit, Wis. *"Molding & Core Sands."*

**19 . . Quad City**
Fort Armstrong Hotel, Rock Island, Ill. Lawrence D. Pridmore, International Molding Machine Co., La Grange Park, Ill. *"Core and Mold Blowing."*

**20 . . Eastern New York**
Circle Inn, Lathams, N. Y. Ralph L. Lee, General Motors Corp., Detroit. *"Man to Man on the Job."*

**22-24 . . Amer. Soc. for Quality Control**
Onondaga County War Memorial Auditorium, Syracuse, N. Y. Sixth Annual Convention.

### June

**16-17 . . Malleable Founders' Society**
Homestead Hotel, Hot Springs, Va. Annual Meeting.

**23-27 . . Am. Soc. for Testing Materials**
New York. Annual Meeting.

### September

**8-10 . . American Standards Association**
Museum of Science & Industry, Chicago. National Standardization Conference.

BIG
in production—in reputation

NAMES
that build confidence

USE
with confidence

*HYBOND
foundry proved

CORE
for faster baking and less scrap

OILS
uniformly high quality at lower cost

How can we help YOU?

See HyBond Cores Booth 339 AFS Convention Atlantic City Test HyBond Write for Samples

Test HyBond • Write us • Our Job-Trained Men will help you.

There is no obligation

MAGIE BROS. INC.

Manufacturers of Lubricating and Specialty Products for 63 Years

Offices: 1640 W. Carroll Ave., Chicago 12, Ill.
Plants: 1640 W. Carroll Ave. • 9101 Fullerton Ave.

# Core Hardness

**Gordon & Campbell**
**CORE HARDNESS TESTER**

Every foundryman knows that the relative hardness condition of cores tells its tale in the casting. All the advantages of accurate core-hardness control can be obtained with this direct-reading, Gordon-Campbell Core Hardness Tester. The test results are dependable — and obtained easily in a few seconds. No special skill is required.

***Write for full particulars.***

**OTHER Gordon & Campbell TESTING EQUIPMENT:**

**Combination Rammer-Compression Tester**—Simple way to prepare specimens to determine compression strength.
**Permtester**—A foolproof method for determining sand permeability.
**Transverse Test Core Maker**—For preparing core specimens for transverse tests.
**Transverse Core Tester**—Rapidly determines transverse strength of dry sand cores.
**Baking Oven**—Electrically heated, dries sand samples, bakes core specimens.
**Moisture Tester**—A reliable method of measuring moisture content.
**Sand Mixer**—For thorough preparation of sample core-sand mixtures.
**Sand Washer**—The easy-to-use method to determine clay content of sand.

Each of these testing units was designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

***Complete information upon request.***

GORDON SERVICE

**CLAUD S. GORDON CO.**
*Manufacturers & Distributors*
Metallurgical Testing Machines • Industrial Furnaces & Ovens • Temperature Control Instruments • Thermocouples & Accessories
Dept. 18 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 18 • 2035 Hamilton Ave., Cleveland 14, Ohio


## September

**8-12 . . Instrument Society of America**
Annual Meeting, Cleveland.

**8-13 . . Molding Materials Program**
Sponsored by the Massachusetts Institute of Technology, Cambridge, Mass. *"Chemistry and Mechanics of Molding Materials."*

**22-23 . . Steel Founders' Society**
Homestead, Hot Springs, Va. Fall Meeting.

**26-27 . . Ohio Regional Foundry Conference**
Ohio State University, Columbus, Ohio Sponsored by A.F.S. Canton District, Central Ohio, Cincinnati District, Northeastern Ohio and Toledo Chapters and Ohio State Student Chapter.

**30-October 3 . . Iron & Steel Exposition**
Public Auditorium, Cleveland. Association of Iron and Steel Engineers.

## October

**16-17 . . Gray Iron Founders' Society**
Hotel Cleveland, Cleveland. Annual Meeting.

**16-18 . . Foundry Equipment Mfrs. Assn.**
The Greenbrier, White Sulphur Springs W. Va. Annual Meeting.

**17-18 . . Michigan Regional Fdy. Conf.**
University of Michigan, Ann Arbor. Sponsored by AFS Central Michigan, Western Michigan, Detroit and Saginaw Valley Chapters and AFS Michigan State and University of Michigan Student Chapters.

**20-24 . . American Society for Metals**
Philadelphia. National Metal Congress and Exposition.

**25-26 . . Northwest Regional Fdy. Conf.**
Multnomah Hotel, Portland, Oregon Sponsored by the Oregon, Washington and British Columbia Chapters and the Oregon State College Student Chapter

## November

**6-7 . . All-Canadian Fdy. Conference**
Mount Royal Hotel, Montreal, Quebec Sponsored by A.F.S. Eastern Canada and Ontario Chapters.

**10-12 . . National Foundry Association**
Edgewater Beach Hotel, Chicago. Annual Meeting.

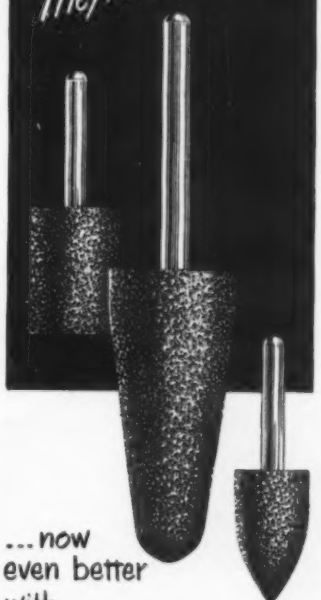
**13-14 . . Southwest Regional Fdy. Conf.**
Hotel Baker, Dallas, Texas. Sponsored by AFS Texas and Tri-State Chapters and Texas A & M Student Chapters.

## February, 1953

**19-20 . . Southeastern Regional Conference**
Tutwiler Hotel, Birmingham, Ala. Sponsored by Birmingham District & Tennessee Chapters and University of Alabama Student Chapter.


# Chicago MOUNTED Wheels

*They're the Best*



...now even better with

## 79E BOND

**the new miracle grinding wheel bond**

Choose Chicago Mounted Wheels — bonded with 79E Bond — and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding, burring and finishing job faster. Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them. Try 79E Bond Mounted Wheels.

***WRITE today for full information and literature. It's free.***

**CHICAGO WHEEL & Mfg. Co.**
Dept. AF • 1101 West Monroe Street
Chicago 7, Illinois

OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

ARROW CHIPPING CHISELS

Are made from the finest quality alloy tool steel obtainable. To give you longer service in actual foundry use all Arrow tools have machined shanks.

Arrow tools have a plus quality not found in other tools and hundreds of foundries from Coast to Coast have standardized on them because they give you longer service.

Remember the name ARROW when you buy chisels.

ARROW TOOLS INC.
1904 S. KOSTNER AVE.,
CHICAGO 23, ILL.

HIGH SILICON IRON

T. M. Reg.

SILVERY
A
BLAST FURNACE
PRODUCT

Metallurgically PURE
Physically Clean
and Uniform

The choice of foundrymen who demand the best

THE JACKSON IRON & STEEL CO.
JACKSON OHIO

PATTERN and FLASK LUMBER from DOUGHERTY

WHITE PINE • MAHOGANY • PLYWOOD

Here's lumber that will cut pattern and flask costs because it is easier to work and has fewer flaws . . . resists cracking and warping . . . responds properly "under the knife". . . keeps pattern making time DOWN and quality UP.

Dougherty Perfection Pattern and Flask Lumber is the wisest buy for your shop!

PALLETS • SKIDS • ROLLERS
BOTTOM BOARDS • TOTE
BOXES • CRATING • FILLETS
DOWELS • TANKS • WEDGES
BENCHES

MID-AMERICA'S LARGEST LUMBER SUPPLIER...

Diamond 1-1200

DOUGHERTY LUMBER CO.
Cleveland 5, Ohio

## foundrymen

*continued from page 44*

mour Research Foundation of Illinois Institute of Technology.

**William J. Brinkworth** is the new representative for distributor sales of Link-Belt Company's Southwestern Div. His headquarters will be in Houston, Tex. Mr. Brinkworth joined Link-Belt in 1929.

**Maury E. Lippert,** sales manager of Silverstein & Pinsof, Chicago, was honored by a dinner-dance given by the company on Nov. 21 to celebrate his 50th birthday and his 11th year as sales manager.

**James H. W. Conklin** has been appointed general sales manager of the Philadelphia Div., Yale & Towne Mfg. Co. Mr. Conklin succeeds **James P. Kinney,** who is taking over the company's distributorship in southern California.

**Joseph H. Humberstone** has been elected a vice-president of Air Reduction Co., Inc., New York. He was formerly president of the company's Airco Equipment Mfg. Div., and has been succeeded in that capacity by **Scott D. Baumer.**

**Lon E. Russell** will handle the sales of counter-flow heaters and crane cab coolers in his new position as sales engineer for the Machinery Div., Dravo Corp., New York. His territory will be the metropolitan New York area.

**William W. Boswell** has been named Richmond, Va., sales representative for the Automatic Transportation Co., Chicago, covering all of Virginia. Mr. Boswell's organization is located at 403 East Franklin St., Richmond.

**Hans A. Altorfer** has been named chief engineer, Nordstrom Valve Division, and **Hans J. Heine,** chief metallurgist for the Barberton Division, Rockwell Manufacturing Co. Swiss-born Hans Altorfer is a graduate of the Winterthur Institute of Technology. He has held executive mechanical engineering positions in several large U. S. tool and equipment manufacturing organizations, including that of supervisor of Allis-Chalmers Mfg. Co.'s Turbo-Power Development Dept. German-born Hans Heine holds an M. S. in metallurgical engineering from the Berlin Institute of Technology. After doing post graduate work in Carnegie Institute of Technology's Metals Research Laboratory, he was employed by the Aluminum Co. of America, joining Rockwell as metallurgist in 1946.

**James A. C. Briggs,** recent graduate of Trinity College, Oxford University, England, visited the A.F.S. National Office and a number of foundries in the United States recently. While at Oxford he re-

ceived a James & George Whitehead Travelling Studentship established to enable worthy graduates to visit parts of the British Empire and foreign countries as a supplement to their formal education.

**Yohei Saito,** metallurgist and foundry manager, Niigata Engineering Co., Ltd., Tokyo, Japan, included A.F.S. Headquarters on his current tour of United States foundries and foundry centers. He has been studying castings production for ships, railroad cars, machine tools, compressors, and diesel engines.

**Martin E. Gilwood** is now director of research, Permutit Co., New York. A graduate in Chemical Engineering from Rensselaer Polytechnic Institute, Troy, N. Y., he has risen from research engineer to assistant manager of research to manager of chemical research to his new position.

**Dale D. Spoor,** former chief of the Industries Branch of the Metalworking Equipment Div. of NPA, has been appointed manager of the Equipment & Process Sales Dept., Air Reduction Co., New York. He left Airco last year on leave of absence to work for the government, and is now returning with his tour of duty finished.

### ▶ *Obituaries*

**Edward G. Mahin,** 75, retired head of the Dept. of Metallurgy at University of Notre Dame, died at South Bend on February 4. He had been suffering from a heart ailment. In 1901 Dr. Mahin joined the staff of Purdue University and became a professor of analytical chemistry in 1914. He aided in the formation of the graduate school there and was the first chairman of the graduate council. In 1925 he went to Notre Dame, where he organized the department of metallurgy and served as its head until his retirement in 1949. He also served on the graduate committee which he helped form in the late '20s. He was the author of five books and many scientific papers. A member of A.F.S., he achieved the honor of being president of the Indiana Academy of Science in 1928 and was a past trustee of ASM. Among his honors were membership in Phi Beta Kappa, Sigma Xi, Tau Beta Pi, and Phi Lambda Upsilon.

**Charles A. Carroll,** formerly of the G. & C. Foundry, Sandusky, Ohio, died recently.

**Karl J. Hepting,** purchasing agent and traffic manager of Hamilton Foundry & Machine Co., Hamilton, Ohio, died recently. He had been with the company for almost 33 years.

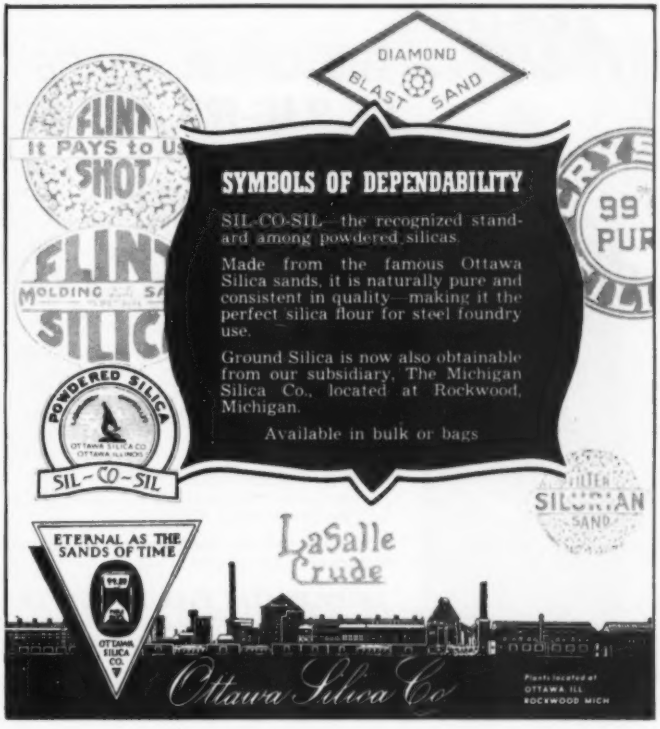
**Frank H. Dodge,** 68, sales representative for the Foundry Div. of Archer-Daniels-Midland Co., Cleveland, died at the Ford Hospital in Detroit February 11. He had been with the company since 1913.

FOUNDED IN 1917

**CARPENTER Brothers Inc.**

MUSKEGON, MICH. Phone 4-7248
ST. PAUL, MINN. Phone EM 6312

606 W. WISCONSIN AVE., MILWAUKEE 3, WIS.
PHONE: DAly 8-0140


DIAMOND
BLAST SAND
SYMBOLS OF DEPENDABILITY
SIL-CO-SIL — the recognized standard among powdered silicas.
Made from the famous Ottawa Silica sands, it is naturally pure and consistent in quality—making it the perfect silica flour for steel foundry use.
Ground Silica is now also obtainable from our subsidiary, The Michigan Silica Co., located at Rockwood, Michigan.
Available in bulk or bags
POWDERED SILICA
SIL-CO-SIL
SILURIAN
SAND
ETERNAL AS THE SANDS OF TIME
LaSalle Crude
Ottawa Silica Co

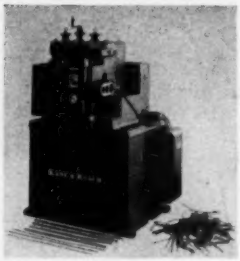
*Established* K&R *1887*

**K & R**

**No. DX5 - F5**

**Roll Core Wire Straightener**

More than ever, due to the present shortage of material, this machine will pay big dividends reclaiming used core wire.



| Size Mach. | Capacity SAE 1020 | Prod. F. P. M. | Rec. Motor |
|---|---|---|---|
| DX5 Roll | ⅛ - ⅜" | 125 | 3 HP |
| F5 Roll | 3/16 - ¾" | 115 | 7½ HP |

NOTE: The above machines can be furnished with 8 or 9 rolls instead of 5 rolls.

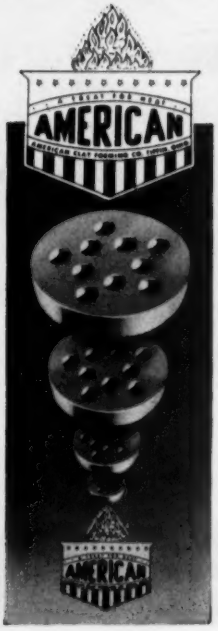
**K & R PRODUCTS**

- ★ Straightening Rolls
- ★ Bending Rolls
- ★ Cold Roll Forming Machines
- ★ Gang Slitters
- ★ Flying Shears
- ★ Crimping Machines
- ★ Hydraulic Tube Benders
- ★ Hydraulic Bulldozers
- ★ Hydraulic Presses
- ★ Edging Machines
- ★ Special Metalworking Equipment

**KANE & ROACH**

Syracuse, New York

**NOW... YOU CAN BE *SURE* OF SLAG-FREE CASTINGS WITH . . .**




**CERAMIC *Strainer Cores!***

★ Cut down on rejects . . . make every casting a good one— by using American Ceramic Strainer Cores. American Cores remain round and uniform during the pouring operation . . . slag remains on TOP of the core. The result? An evenly poured, slag-free casting EVERY time.

American representatives will quote prices on any size Strainer Core.

Write today for samples and descriptive literature.

**AMERICAN CLAY FORMING COMPANY**

TIFFIN, OHIO ★ TYLER, TEXAS

National Sales Representative

Williston & Company, Delta, Ohio

*MANFACTURERS OF SPECIALIZED REFRACTORIES FOR OVER 30 YEARS*

## *AFS Introduces*

*continued from page 153*

### Southern California

James Clayton Finley, Salesman, *Oliva & Tatro.*
Richard L. Kumer, Sales Mgr., *H. J. Kumer & Co.*
Jack M. Oakey, Secy-Treas., *Howell Foundry Co.*
Rayburn E. Orr, Sales Repr., *Howell Foundry Co.*
Joe Stinson, Fmn., *Howell Foundry Co.*

### Tennessee

Frank Abercrombie, Stockroom Supv., *Combustion Engineering Superheater.*
Clifford Baker, Asst. to Master Mech., *Combustion Engineering Superheater.*
John M. Barksdale, Gen. Maintenance Fmn., *Combustion Engineering Superheater, Inc.*
C. Kenneth Flagg, Steel Foundry Supv., *Ross-Meehan Foundries.*
Walt A. Fundinger, Jr., Industrial Engr., *Combustion Engineering Superheater.*
Donald F. Lynskey, Fmn., *Combustion Engineering Superheater, Inc.*
James O. Martin, Fmn.—Sand Preparation, *Combustion Engineering Superheater, Inc.*
Carl McFarlin, Jr., Vice Pres., *Tennessee Products & Chemical Corp.*
Ray M. Morrison, Quality Control, *Combustion Engineering Superheater, Inc.*

### Texas

Clyde E. Baler, Fmn. Pipe Fdry., *Lone Star Steel Co.*
Jack Paul Bird, Molder, *American Brass Foundry.*
William M. Edward, Blast Furnace Pig Mach. Supv., *Lone Star Steel Co.*
Thomas M. Hart, Asst. to V.P. Operations, *Lone Star Steel Co.*
E. C. Herritage, *Peerless Supply Co.*
Russell McBride, Partner, *McBride Pattern Works.*
Marvis L. Smith, Sand Tech., *Hughes Tool Co.*
W. M. Taylor, Sales Mgr. & Asst. Gen. Mgr., *Thermo Fire Brick Co.*
Fred K. Tigert, Cupola Hatcher, Ladle Liner, *Lone Star Steel Co.*
G. C. Wright, Asst. Mgr., *Big Sandy Sand & Gravel Co.*
John T. Wright, Mgr., *Big Sandy Sand & Gravel Co.*
Ed. B. Yost, Sales Mgr., *Johns-Manville Sales Corp.*

### Toledo

Alfred D. Carr, *Unitcast Corp.*
G. E. Humbert, *Unitcast Corp.*
William Miller, Personnel Dir., *Unitcast Corp.*
David H. Mostov, Pres., *Toledo Trading Co.*
Donald Weseman, Asst. Fmn., *Unitcast Corp.*

### Twin City

Raymond R. Brooks, Lubrication Engr., *Cities Service Oil Co.*

### Washington

Richard G. Wagner, Jr., *U.S. Naval Shipyard, Puget Sound.*

**Western Michigan**
Tom N. Dalton, Chief Engr., *West Michigan Steel Foundry Co.*
Andrew Groeneveld, Appr., *Campbell, Wyant & Cannon Fdy. Co.*
Donald D. McDonall, Buyer, *John Wood Co.*
Chas. M. Pierce, *Western Michigan Steel Fdy. Co.*

**Western New York**
George A. Koch, *Hewitt-Robins, Inc.*

**Wisconsin**
Robert W. Eck, Vice-Pres., *Eck Foundries, Inc.*
Robert Jack Christ, Student, *University of Wisconsin.*
Walter W. Hochuli, Gen. Mgr., *Middle States Foundry.*
Edward W. Korty, Sales Engr., *Johns-Manville Sales Corp.*
Joseph Rutkauskas, Plant Mgr., *Grede Foundries, Reedsburg Div.*
Kenneth A. Tamms, Field Engr., *Raybestos-Manhattan Inc.*

## Student Chapters

**Michigan State College**
Norman Lorenson
James Reif
Inouye Shingo

**Missouri School of Mines**
John A. Bara Jr.,
George McQuie
Nicholas J. Gioseffi
Ernest Thomas McBreyer, Jr.

**Oregon State College**
Rolland R. Bilyeu
Ray Soderquist
Delbert B. Blanchard
Roland C. Valitchka
Charles J. Evans
Wayne T. Walker

**University of Michigan**
Durmus Attila
Joseph Datsko
Donald E. Firth
Norman C. Krupp
Peter Warren Moore
Richard A. Pereles
Harold M. Smith
Robert Storm Vanderzee
Howard Wilber Beatty
C. Dale Dickinson
Albert M. Hagopian
Norman Paul Lillybeck
Frank B. Nair
Adron I. Rush
Tyrus Raymond Smith
John R. Vennerholn
John Nicholas Bollas
Arthur W. Donkin
Halil Kaya
Dilip C. Metha
Navnitlal Bhagubhai Patel
David E. Smith
P. K. Trojan
Neil V. Will

## International

**Austria**
George Schmid, Jr., Partner, *M. Schmid & Sohne, Ferstelgasse.*

**England**
Raymond John Joyce, Fdy. Met., *E. W. Wynn, Ltd., Cannoch, Staffordshire.*

**Japan**
Kazumasa Fukuyama, *Shikou Machinery Co., Ltd., Ehimeken.*
S. Yamaguchi, Fdy. Engr., *Mitsui Shipbuilding & Engrg. Co., Tamano City.*
Sanya Hashimoto, Dir., *Mitsui Shipbuilding & Engrg. Co., Tamano City.*

SEMET-SOLVAY
FOUNDRY COKE
In trouble?—Semet-Solvay metallurgists are practical foundrymen who will always be glad to help with your melting problems. Take advantage of their broad experience and get the most out of your Semet-Solvay coke.
SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation
CINCINNATI · DETROIT · BUFFALO
In Canada: SEMET-SOLVAY COMPANY, LTD., TORONTO
for Better Melting

## *index to*

# *Advertisers*


47 Adams Co., The
74 Ajax Electrothermic Corp.
15 Ajax Engineering Corp.
161 Ajax Flexible Coupling Co., Inc.
71 Allis-Chalmers Mfg. Co.
6-7 American Air Filter Co., Inc.
208 American Clay Forming Co.
179 American Lava Corp.
176 American Monorail Co.
174 American Refractories and Crucible Co.
29 American Wheelabrator & Equipment Corp.
162 Ansul Chemical Co.
Back cover Apex Smelting Co.
Inside back cover Archer-Daniels-Midland Co. (Foundry Products Div.)
206 Arrow Tools Inc.
14 Baker Perkins, Inc.
173 Baroid Sales Div., National Lead Co.
10-11 Beardsley & Piper Div., Pettibone Mulliken Corp.
28 Black, Sivalls & Bryson, Inc.
202 Campbell-Hausfeld Co.
4-5 Carborundum Co., The
207 Carpenter Bros., Inc.
205 Chicago Wheel & Mfg. Co.
27 City Pattern Foundry & Machine Co.
36-37 Cleveland Flux Co.
23 Cleveland Metal Abrasive Co.
175 Cleveland Quarries Co.
204 Cleveland Vibrator Co.
82 Crucible Manufacturers' Assn.
158 Davenport Machine & Foundry Co.
54-55 Delta Oil Products Co.
24-25 Demmler, Wm., & Bros.
61 Detroit Electric Furnace Div., Kuhlman Electric Co.
81 Detroit Sheet Metal Works
60 Dings Magnetic Separator Co.
206 Dougherty Lumber Co.
66 Dow Corning Corp.
12 Eastern Clay Products Dept., International Minerals & Chemical Corp.
76-77 Electro Metallurgical Co., A Division of Union Carbide & Carbon Corp.
203 Exothermic Research Products
22 Fanner Mfg. Co.
1 Federal Foundry Supply Co.
80 Federated Metals Div., American Smeltg. & Refng. Co.
72-73 Foundry Equipment Co.
178 Foundry Services, Inc.
154 Fremont Flask Co.
46 Giffels & Vallet
79 Girdler Corp.
13-205 Gordon, Claud S., Co.
8 Harris, Benj., & Co.
45 Hercules Powder Co.
152 Hickman, Williams & Co., Inc.
38-39 Hydro-Blast Corp.
201 Illinois Testing Laboratories, Inc.
150 Induction Heating Corp.
21 Industrial Equipment Co.
56-57 International Molding Machine Co.
51 International Nickel Co.
206 Jackson Iron & Steel Corp.
208 Kane & Roach, Inc.
177 Keokuk Electro-Metals Co.
52 Kirk & Blum Mfg. Co.
16 Lindberg Engineering Co., Fisher Furnace Div.
9 Link-Belt Co.
204 Magie Bros., Inc.
198 Martin Engineering Co.
2 Mathieson Chemical Corp.
63 Modern Equipment Co.
34 Monsanto Chemical Co.
151 National Carbon Co., Union Carbide & Carbon Corp.
168-169 National Engineering Co.
67 National Foundry Sand Co.
152 National Metal Abrasive Co.
165 Newaygo Engineering Co.
40-41 Nicholls, Wm. H., Co., Inc.
53 Ohio Crankshaft Co.
65 Ohio Ferro-Alloys Corp.
178 Oliver Machinery Co.
167 Orefraction Inc.
207 Ottawa Silica Co.
203 P.M.S. Co., The
68-69 Pangborn Corp., Blast Cleaning Div.
26 Pangborn Corp., Malleabrasive Div.
48 Pekay Machine & Engineering Co.
172 Pelron Corp.
78 Pennsylvania Foundry Supply & Sand Co.
19 Pennsylvania Glass Sand Corp.
49 Penola Oil Co.
Inside front cover Pittsburgh Lectromelt Furnace Corp.
155 Reda Pump Co.
30 Research Corp.
159 Rotor Tool Co.
50 Royer Foundry & Machine Co.
178 Scientific Cast Products Corp.
35 Schneible, Claude B., Co.
209 Semet-Solvay Div., Allied Chemical & Dye Corp.
201 Severance Tool Industries, Inc.
75 Simplicity Engineering Co.
180 Standard Electrical Tool Co.
209 Standard Horse Nail Corp.
17-18 Sterling Wheelbarrow Co.
31 Stevens, Frederic B., Inc.
200 Stoller Chemical Co.
59 Sutter Products Co.
64 Swan-Finch Oil Corp.
58 Taylor, Chas., Sons Co.
Union Carbide & Carbon Corp.
76-77 Electro Metallurgical Co.
151 National Carbon Corp.
20 U. S. Graphite Co.
171 U. S. Hoffman Machinery Corp.
197 Westover Engineers
32-33 Whiting Corp.
199 Wiegand, Edwin L., Co.
171 Wilkinson Equipment & Supply Corp.

**A.F.S. Publications**

212 General Book Listing
70 Foundry Sand Handbook

# employment

■ To contact "Help Wanted" or "Position Wanted" advertisers, write to American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. In replying to "Help Wanted" advertisements, applicants must send outline of background.

## Help Wanted

**HW 590 Plant Engineer and Master Mechanic**

Young engineer, preferably Mechanical, to specialize in Preventive Maintenance and Plant Engineering. Progressive mechanized foundry in Northeastern Ohio. Fine opportunity for good man. Salary and bonus.

## Positions Wanted

**PW 173 Foundry Manager**

Qualified to take complete charge of a foundry or foundries and capable of developing a good organization. Well versed in all phases of gray iron foundry work. 18 years executive background. Quality light and medium-heavy castings. Excellent labor record and best of references. Locate anywhere—domestic or foreign.

**JOB PRODUCTION ALLOY FOUNDRY**

**Having trouble with delivery of new equipment?**

Here is a modern installation only 7 years old and well maintained that is suitable for job or production castings of 100,000 lb per month. Included is a Beardsley & Piper #S-490 Sandslinger, a #610 Clearfield sand mixer, Schneible Roto-Clone dust collector, magnetic belt, breaker barrel, elevators, sand bins, roller conveyor, flasks, clamps, etc. All this can be had at a fraction of its 1946 cost. We would prefer to have you remove it as a whole but all reasonable offers for individual units will be considered. For a complete list of items and prices, please write

**BOX N-122**

American Foundryman 616 S. Michigan
Chicago 5, Illinois

**SALESMAN WANTED**

Applicant must have proven experience in the sale of non-ferrous metals. Metallurgical degree or equivalent knowledge helpful. Adaptability to our technical and sales policies will be necessary. Prefer applicant between 25-35 years, willing to travel. A complete résumé of education and work record, including a recent photograph, is requested. Location: Great Lakes Area.

**BOX N-123**

American Foundryman 616 S. Michigan
Chicago 5, Illinois

**ADDITIONAL LINE WANTED**

Manufacturers' agent with offices in Birmingham, Ala., calling on foundries in the South and Southeast, desires additional line. If interested in high-class representation in this fast-growing section, this is an opportunity to make a desirable connection. We are metallurgical and foundry engineers and have successfully worked the territory for 20 years.

**BOX N-124**

American Foundryman 616 S. Michigan
Chicago 5, Illinois

**FOUNDRY METALLURGIST**

Excellent opening for metallurgical engineer with interest and knowledge of modern research methods in foundry field. Practical foundry background preferred. Excellent opportunity for personal and professional advancement in expanding organization.

**Assistant Director for Personnel**
**ARMOUR RESEARCH FOUNDATION**
**ILLINOIS INSTITUTE OF TECHNOLOGY**
**Chicago 16, Illinois**

**DEPARTMENT HEADS**
**STEEL FOUNDRYMEN**

Opportunities for department heads in a large steel foundry. Department heads needed in:

**Molding Core CF & A**

Government-owned defense plant in Chicago area operating on armor steel castings. Company operating setup sufficiently large and aggressive to afford permanent opportunity to men whose performance proves outstanding.

**BOX N-121**

American Foundryman 616 S. Michigan
Chicago 5, Illinois

**FOR SALE**
**GRAY IRON FOUNDRY**

Located southern Illinois town. Population over 10,000. Water and railroad transportation available. Labor plentiful. Foundry with two clear spaces 80 x 320, with overhead monorail. Has two No. 7 Whiting cupolas 72" diameter. Contains equipment ideal for mechanized operations.

**BOX N-120**

American Foundryman 616 S. Michigan
Chicago 5, Illinois

**SALESMAN WANTED**

**Sand Castings—Brass—Bronze—Aluminum**

Only experienced man with contacts need apply.

**HALL FOUNDRIES**

Executive Offices: 100 West 52nd St., N. Y. C.
Telephone CIrcle 7-1675
Foundry: Bridgeton, N. J. Telephone 9-1091.

**FOUNDRY CONTACTS?**

Excellent opportunity for men acquainted with the foundry industry in Eastern, Southern and Western United States. Have attractive proposition for those capable of producing core oil business in these areas. Write direct, or contact Mr. Bodman, Booth 339, A.F.S. International Foundry Show, Atlantic City.

**MAGIE BROTHERS, Inc.**
1640 Carroll Ave. Chicago 12, Ill.

**WANTED**

100-250 KW H.F. Induction Furnace

Write full details to:

**BOX 2188**

University, Alabama

**Classified and Employment Ad Rates**

- **Classified ads**—$10 per column inch
- **Employment Service**—"Position Wanted" ads $5. "Help Wanted" ads $10.
- **Professional Cards**—$10.

**American Foundryman**
616 S. Michigan Chicago 5, Ill.

## ▶ Professional Services

**Harold J. Roast**
F.I.M., F.C.S., M.E.I.C.
**BRONZE FOUNDRY CONSULTANT**
c/o Crown Trust Co.
284 Dundas St. London, Ont., Canada
*Available Coast to Coast*

**Lester B. Knight & Associates, Inc.**
Member A.C.M.E.
***Consulting Engineers***
**Management • Sales • Production • Surveys**
**Modernization • Mechanization**
600 West Jackson Blvd., Chicago 6, Ill.
Eastern Office: Lester B. Knight and Associates
30 Church St., New York 7, N. Y.

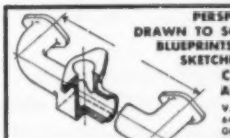
**Westover ENGINEERS**
FOUNDRY MANAGEMENT CONSULTANTS
3110 West Fond Du Lac Ave., Milwaukee 10, Wis.
There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

**EARL E. WOODLIFF**
**FOUNDRY SAND ENGINEER**
***Consulting • • Testing***
14611 Fenkell (5-Mile Rd.) Detroit 27, Mich.
Res. Phone Vermont 5-8724

**METALLURGICAL**
**CHEMISTS** *Accuracy* **CONSULTANTS** *Service*
**ACCURATE METAL LABORATORIES**
2454 W. 38th St. • Phone: YI 7-6090 • Chicago 32, Ill.

**W. G. REICHERT ENGINEERING CO.**
**PROFESSIONAL FOUNDRY ENGINEERS**
***Surveys • Modernization***
***Operations • Management***
1060 Broad St. Newark 2, N. J.
Industrial Bldg.

**CHEMISTS and METALLURGISTS**
Grey Iron Foundry Consultants
Complete Foundry Testing
*Established over 25 years*
**A. H. PUTNAM COMPANY**
Rock Island, Illinois



**PERSPECTIVES DRAWN TO SCALE FROM BLUEPRINTS OR SHOP SKETCHES — FOR CASTING ANALYSIS**
V. L. SHERMAN
643 HILLSIDE
GLEN ELLYN, ILL.
PHONE 723-J

# A.F.S. Publications

| | Publication Number | A.F.S. Members | Non-Members |
|---|---|---|---|
| **Books** | | | |
| Alloy Cast Irons Handbook (2nd Edition) | 1 | $2.75 | $4.50 |
| Analysis of Casting Defects | 3 | 2.50 | 4.25 |
| Cupola Operations Handbook | 7 | 6.00 | 10.00 |
| Development of Metal Castings Industry | 8 | 3.00 | 6.00 |
| Foundry Core Practice (2nd Edition) | 38 | 6.50 | 10.00 |
| Foundry Sand Handbook (6th Edition) | 12 | 3.50 | 5.25 |
| Foundry Work | 50 | 1.76 | 1.76 |
| Recommended Practices for Sand Casting Aluminum & Magnesium Alloys | 24 | 1.00 | 1.75 |
| Recommended Practices for Sand Casting Non-Ferrous Alloys | 25 | 2.25 | 4.00 |
| **Symposia** | | | |
| Foundry Dust Control | 10 | 1.00 | 2.00 |
| Graphitization of White Cast Iron | 15 | 2.25 | 4.00 |
| Malleable Foundry Sand and Core Practice | 16 | 2.00 | 3.25 |
| Sand Test Data for Production of Steel Castings | 47 | 3.00 | 4.75 |
| Symposium on Principles of Gating (Available June, 1952) | 56 | | |
| **Foundry cost booklets** | | | |
| Classification of Foundry Cost Factors | 6 | 1.00 | 2.00 |
| Foundry Cost Methods | 9 | 1.50 | 3.00 |
| **Recommended practices—safety and hygiene** | | | |
| Fundamentals of Design, Construction and Maintenance of Exhaust Systems | 19 | 3.00 | 5.00 |
| Good Practices for Metal Cleaning Sanitation | 20 | 1.25 | 2.25 |
| Grinding, Polishing and Buffing Equipment Sanitation | 22 | .75 | .75 |
| Industrial Housekeeping and Sanitation | 23 | 1.00 | 2.00 |
| Safety Practice for Protection of Workers in Foundries | 21 | 1.25 | 2.25 |
| Testing and Measuring Air Flow | 26 | 1.00 | 2.00 |
| **Annual Transactions** | | | |
| Volume 51—1943 | 27 | 3.00 | 15.00 |
| Volume 53—1945 | 30 | 4.00 | 15.00 |
| Volume 54—1946 | 31 | 4.00 | 15.00 |
| Volume 55—1947 | 32 | 4.00 | 15.00 |
| Volume 57—1949 | 33 | 8.00 | 15.00 |
| Volume 58—1950 | 45 | 8.00 | 15.00 |
| Volume 59—1951 | 48 | 8.00 | 15.00 |
| Index to AFS Transactions (1930-1940) | 36 | 1.00 | 2.00 |
| **Education** | | | |
| Apprentice Training Standards for the Foundry Industry | 29 | 1.00 | 2.00 |
| Foundry Apprentice Course Outline | 39 | 1.00 | 2.00 |
| Guide for Foremen Training Conferences | 34 | 1.50 | 2.25 |
| **A. F. S. research progress reports** | | | |
| Aluminum and Magnesium—A Study of the Principles of Gating | 54 | 1.00 | 1.50 |
| Brass and Bronze—Melt Quality and Fracture Characteristics of 85-5-5-5 | 55 | 1.00 | 1.50 |
| Gray Iron—Risering of Gray Iron Castings—Report No. 1 | 42 | 1.00 | 2.00 |
| Gray Iron—Risering of Gray Iron Castings—Report No. 2 | 43 | 1.00 | 2.00 |
| Malleable—Surface Hardening of Pearlitic Malleable Irons | 52 | .40 | .60 |
| Steel—Steel Sands at Elevated Temperatures (Tenth) | 53 | .40 | .60 |
| **A. F. S. special publications** | | | |
| Bibliography of Centrifugal Casting | 35 | 1.50 | 2.25 |
| Cupola Research Committee Reports | 49 | 1.00 | 1.50 |
| Engineering Properties of Cast Iron | 46 | 2.25 | 3.50 |
| 85-5-5-5 Test Bar Design (Fourth Annual Lecture—1946) | 37 | 1.00 | 2.00 |
| Gating Terminology Chart (Discount on Quantity Lots) | | .10 | .25 |
| Graphite Classification Chart (25 x 38 in.) | 44 | 1.25 | 1.75 |
| Pattern Standard Color Chart (Discount on Quantity Lots) | 35 | .10 | .25 |
| Permanent Mold Castings Bibliography | 18 | 1.50 | 3.00 |
| **Other publications** | | | |
| Aluminum Foundry Process Control (SAE) | 2 | 1.00 | 2.50 |
| Ferrous Foundry Process Control (SAE) | 11 | 1.50 | 2.50 |
| Gates and Risers for Castings (Penton Pub. Co.) | 40 | 6.00 | 6.00 |
| Non-Ferrous Melting Practice (AIME) | 41 | 3.00 | 3.50 |

**Please send books circled**

**AMERICAN FOUNDRYMEN'S SOCIETY**
**616 South Michigan Avenue, Chicago 5, Illinois**

Please send the books circled below. $_____ remittance enclosed.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 14 | 15 | 16 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |

Name _____

Address _____

City _____ Zone _____ State _____

Company _____

AFS pays postage when remittance accompanies order.

# PILLS for ailing core ovens?

AN A D M OF CORE MAKING

*For a simple check* on core oven baking conditions, use "temperature pills"—little pellets that are made to melt at any specific point; accurate to ±1 degree. Place them on core plates or driers to reveal temperature variations within the oven. Bury them in sample cores to find out how hot the core interior becomes.*

**Your LINOIL man carries "temperature pills." Ask him to check your ovens.*

LINOIL PRODUCE BETTER CORES AT LOWER COST

**ARCHER-DANIELS-MIDLAND COMPANY**

*Foundry Products Division*
2191 West 110th Street
Cleveland 2, Ohio

# APEX

# Z-50

*aluminum alloy*

APEX SMELTING COMPANY